THIS WEEK'S National Petroleum NEWS

Index to Coming Meetings

California Oil & Gas Association, Los Angeles, Calif., Mar. 6.

Western Petroleum Refiners Association, Shreveport, La., March 10, 11, 12.

Pennsylvania Oil Men's Association, Elks Hotel, Philadelphia, March 11, 12.

Tennessee Oil Men's Association, Patten Hotel, Chattanooga, Tenn., March 14.

Independent Oil Men of America, Chicago, March 17, 18.

Michigan Oil Men's Association, Statler Hotel, Detroit, March 19, 20, 21.

American Association of Petroleum Geologists, Roosevelt Hotel, New Orleans, La., March 20, 21 and 22.

American Oil Burner Association and National Oil Burner Show, Hotel Stevens, Chicago, April 7 to 12.

National Petroleum Association, Cleveland, O., Apr. 24, 25.

NATIONAL PETROLEUM NEWS

Vol. 22 No. 9

Published by

The National Petroleum Publishing Co.
1213 W. Third St., Cleveland, O.

Tel. CHerry 7672

Branch Offices:

Tulsa, 904 World Bldg., Tel. 3-7132.

New York, 342 Madison Ave., Tel. Vanderbilt 3951.

Houston, 2020 Gulf Bldg., Tel. Fairfax 6286.

Chicago, 35 E. Wacker Drive, Tel. State 4141.

Subscription rate $3.50 per year U. S., Mexico and Canada; $5 Foreign countries. Current copies 10 cents; for back issues more than two months old 25 cents per copy.

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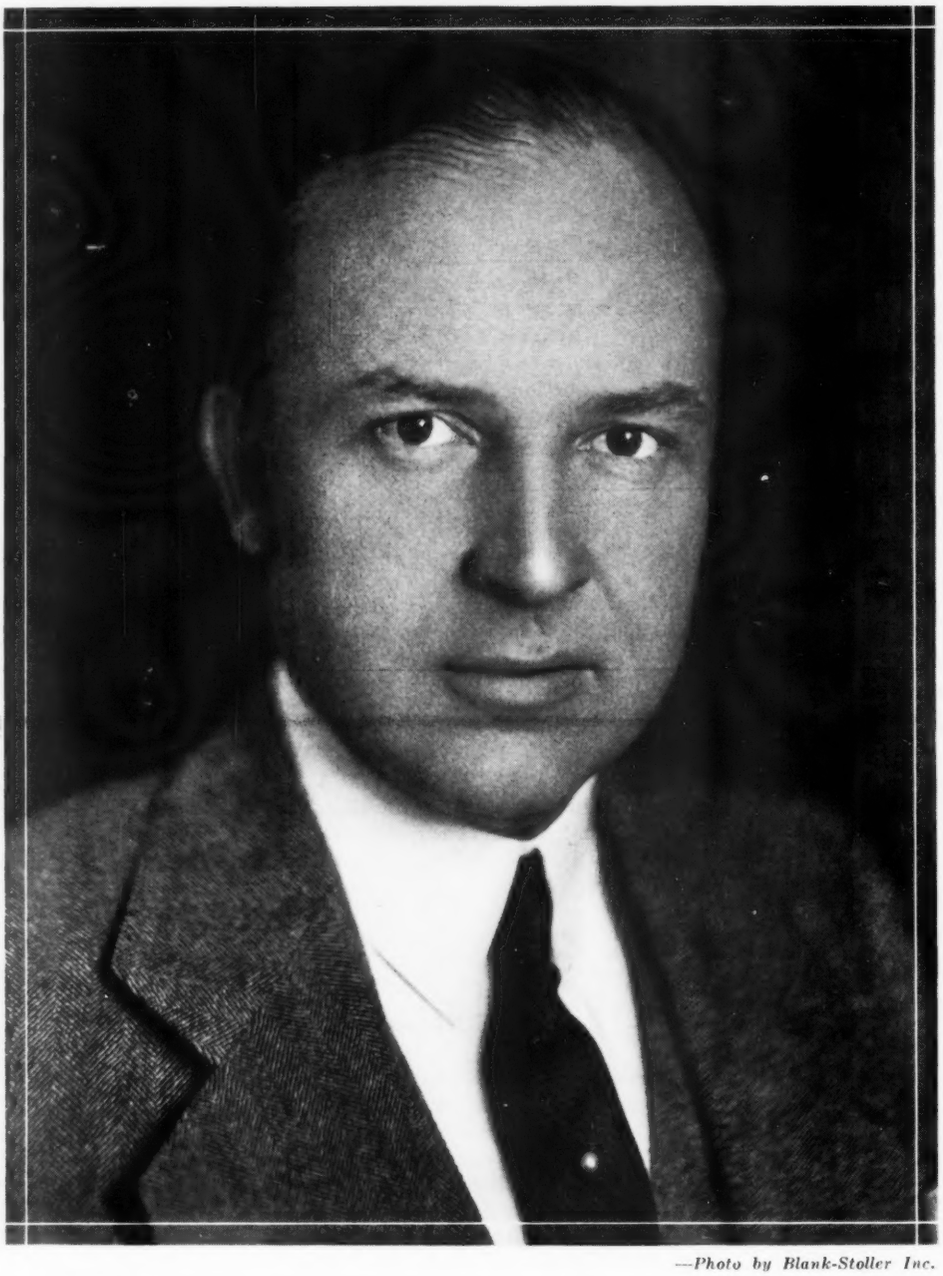


—*Photo by Blank-Stoller Inc.*

FRED G. CLARK, president of the Fred G. Clark Co. of Cleveland, was in the nation's news spotlight last week when he appeared before the congressional committee investigating prohibition. He is commander-in-chief of the Crusaders, a new organization seeking a change in the eighteenth amendment to give states control of liquor sales. It does not seek return of the saloon.

Testimony of Mr. Clark was that the Crusaders now is organized in three cities and has obtained 50,000 members in the past two weeks. Members are coming in at the rate of 1000 per day he said. Within a year he expects to have organizations in 30 cities.

Mr. Clark became head of the Fred G. Clark Co. at the close of the war. He opened additional branches of the company and brought out Hyvis oil as a national brand of Pennsylvania motor oil.

His father was one of the best known oil men in the early days of the oil industry when John D. Rockefeller was active in business. The elder Mr. Clark began as a broker of lubricating oils and later built the Conewango Refining Co. plant.

NATIONAL PETROLEUM NEWS

Published at
1213 W. Third St.
Cleveland

Branch Offices
Tulsa, New York, Houston,
Chicago

Vol. 22 CLEVELAND, February 26 No. 9

Standard of New York-Vacuum Merger Would Have 9% of U. S. Markets

By R. B. Stafford
N. P. N. STAFF WRITER

CLEVELAND, Feb. 24

MERGING of the Standard Oil Co. of New York and the Vacuum Oil Co. will give the combined interests 9 per cent of the petroleum markets of the United States, without including the lubricating oil specialties of the Vacuum in the reckoning.

The 9 per cent figure, taken from the letter sent by the Standard and Vacuum to their stockholders to announce their decision to consolidate the two companies, means that these two present interests will control, after conclusion of the consolidation, one-eleventh of the American petroleum market and will have distribution in every state of the United States.

Only two other companies at present have nation-wide distribution. They are The Texas Co. and the Shell Oil Corp., which works through three subsidiaries.

The contract between the Standard of New York and Vacuum will be tested first in the courts through an action in equity to let the courts determine whether consolidation would violate the Standard Oil dissolution decree of 1911, as both the companies formerly were subsidiaries of the Standard Oil Co. of New Jersey.

The merger is to be effected through the formation of a holding company to be styled General Petroleum Corp. Shares of General are to be issued share for share for Standard of New York stock and three shares of General for each outstanding share of Vacuum. The companies' letters to stockholders do not state when an exchange is to be effected but, as is usual in the merging of corporations, the stockholders must first vote to approve the consolidation.

The letters do state, however, that submission to stockholders of the contract between Standard of New York and the Vacuum will not be immediately, in deference to the legal proceedings.

The consolidation will mean the creation of another petroleum unit with a billion or more dollars of assets, and with world-wide distribution for its products. Abroad the two companies have worked hand in hand for years but in this country each has gone its own way. A few years ago Vacuum even became a competitor with service stations in western New York where the Standard was the predominating marketer.

It was in this territory that the Vacuum first entered the retail gasoline and motor oil business, when it acquired control of the Metro Stations, Inc., Olean, N. Y. This Metro chain also extended into the northern tier of counties in Pennsylvania.

A year or so ago Vacuum began tank truck deliveries to dealer customers in Philadelphia, but in the last few months it has begun a campaign for retail outlets which is expected to assure it a dealer structure in case the Independent marketers should continue to sell out to larger companies at the rate they have been selling in the last year and a half.

Vacuum is building a chain of service stations in Philadelphia. It has bought distributing companies in Philadelphia and Scranton, Pa., and interests in the Lubrite Refining Co., St. Louis, the Commonwealth Oil Co., Cleveland, in companies in Wisconsin, western Pennsylvania, including Pittsburgh, and Michigan.

The company's policy in the acquisition of market outlets was outlined last week in an effort to allay many conflicting rumors, by Frank W. Lovejoy, general sales manager of the Vacuum, at the Columbus convention of the Ohio Petroleum Marketers Association.

"We are buying outlets to have a blue chip in the game when the banks close," Mr. Lovejoy put it, referring to the numerous sales of distributors which sales have cut off many of Vacuum's Mobiloil outlets. Mr. Lovejoy said Vacuum was buying onto the Independent distributors but not buying control.

MR. LOVEJOY predicted the continuance of the Independent service station chains because there is a niche in the economic scheme for the local dealer who is a real merchant. In acquiring a financial interest in service station chains, Mr. Lovejoy said, the Vacuum was not requiring the operators of the stations to throw out all motor oils except Mobiloil.

He gave as an example the Lubrite Refining Co. at St. Louis which continued to sell HyVis after Vacuum

however, that if Vacuum's oils outsold the other oils with which it was in competition at a station and eventually displaced the competing oils, that that was sound business and competing oils could not complain.

Competitors forced the Vacuum into the gasoline business, Mr. Lovejoy asserted but he did not explain how. It is known that loss of outlets for its oil because Independent stations which sold Vacuum oils sold to competing companies or large refining companies, such as some of the Standards, developed their own motor oils and thus replaced Mobiloils, and left the latter without outlets in some large markets.

"We were forced into the gasoline business," Mr. Lovejoy reiterated, "but we will take the Independent marketer with us, even if we have to chloroform him."

HE SAID the Vacuum was preparing to acquire an interest in thousands of outlets but so convinced was it that the Independent oil merchant was the right outlet that 10 years from now the company would not have a company owned outlet. What effect the proposed merger will have on the latter statement only time can answer, but it is doubtful that Mr. Lovejoy had in mind the stations which the Standard of New York and its subsidiaries—Magnolia Petroleum Co., White Eagle Oil & Refining Co., and General Petroleum Co. of California—already own.

"No refiner has ever successfully retailed, and no retailer has ever successfully refined," Mr. Lovejoy said in explaining why Vacuum was not buying 51 per cent interest in the chains it was buying into.

The company wants the men who built the chains to stay there and operate the business in the communities where they are known, Mr. Lovejoy explained. Mr. Lovejoy reiterated a statement he has made frequently the last few years that the large company may be able to buy a chain of service stations but it never was able to buy the goodwill of a community in which the stations were situated.

Consolidation of the two companies will give the Vacuum outlets at all Standard of New York stations and dealers. In New York and New England the Standard has probably a more closely knit blanket of market facilities than any of the other large companies in any part of the United States. In that territory Beacon Oil Co., subsidiary of the Standard Oil Co. of New Jersey, is selling Mobiloils. In Atlantic Refining Co. territory, Vacuum has begun to assemble its own partly owned outlets.

In the southern states Vacuum has distribution through the Standard Oil Co. of Kentucky and will have more through Magnolia Petroleum Co. in the Southwest. In Ohio it has the Refiners Oil Co., Dayton, and some of its partly owned distributors. In the Middle West it has distribution through the Lubrite Refining Co., St. Louis, and will have more through the White Eagle stations which also extend into the Rocky Mountain territory. On the Pacific coast the Standard of California handles the oil.

The Vacuum sells its lubricating oils all over the world and is engaged in the marketing of gasoline and kerosene in Australasia, Egypt, South, East and West Africa and parts of Europe where the New York company is not marketing those products. The New York company has large markets in the Orient, India and all parts of the Near East. Setting forth the importance of the union of the two companies the letter to stockholders reads in part:

"To maintain their position abroad against powerful foreign competitors, strongly entrenched as to crude supplies, and refining and distributing facilities, the union of the complementary businesses of the New York and Vacuum companies and their resources is regarded as vitally important and directly promotive of American interests in business in such countries. The crude supply of the New York company and its refining facilities for gasoline and kerosene will tend to protect and extend the marketing outlets which the Vacuum company has established for those products.

"In the United States there have been rapid changes in conditions in the petroleum business which make this merger useful for both companies. The prevailing method of doing business in the oil industry has come to be for each company doing a general business in petroleum products to have its own crude supply, its own refining facilities and to offer a full line of petroleum products through intensive marketing facilities.

"The New York company, handling gasoline and petroleum products generally, has developed along these lines and has extensive facilities for distributing gasoline to motorists. In the United States, the Vacuum company, having devoted itself primarily to the manufacture and marketing of its high grade lubricants, has created a national consumer demand for its lubricating specialties.

"THE merger will make available to the distinctive Vacuum products a very much wider distribution and sale, and it will also make available the large crude oil production of the subsidiaries of the New York company.

"The New York company's distributing facilities are in process of expansion in response to another prevailing tendency. In this automobile age, each large oil company handling gasoline primarily, although formerly marketing its products in only a portion of the country, now seeks to extend its activities generally throughout the United States so as to get the most complete use of its overhead organization, of its standing with its customers and of its national advertising.

"For example, the New York company originally confined its distributing facilities in this country to New York and New England where it had a great preponderance of the business. But at present there are now actively competing with each other in that territory, in addition to numerous local companies, not less than eleven separate and distinct major concerns each with widely developed distributing facilities in this territory and a number of them already having nationwide distribution for their products.

"In line with this tendency the New York company has already in the last few years extended its distribution into the west and southwest. The Vacuum company has for years had a nationwide reputation for its highly-specialized lubricants, which will be of advantage to the New York company in further extending its marketing of gasoline.

"THE united company, in addition to the specialized lubricating products of the Vacuum company, will market, it is estimated, about 9 per cent of the petroleum products consumed in the United States, an amount comparable in volume with the business done by each of several of the larger of its numerous competitors. In foreign countries it will carry on the widespread and important business above described."

It is then stated that the facts as to the proposed merger were laid before the government. Then the question about the dissolution decree arose. The decree did not forbid non-competing units of the old Standard from rejoining but did forbid any combination which would result or might result in restraint of commerce.

Under the merger both the Vacuum and Standard of New York will continue to operate as separate businesses under the present managements. The board of directors of the General Petroleum Corp. will consist of an equal number of directors chosen from the present directorates of the component companies.

The assets of the Standard of New York at the end of 1928 after deduction of reserves for depreciation and depletion amounted to approximately $695,000,000, the Vacuum after all reserves to $186,000,000 and the White Eagle to about $20,000.000, a total of $901,000,000 after deduction of all reserve funds. As 1929 was probably a good year for the organizations, it is likely that after reserves the present assets of the two companies may be worth more than $1,000,000,000.

Chance for Tariff in Present Congress Leader Franklin Believes

By Lawrence E. Smith
N. P. N. STAFF WRITER

WASHINGTON, Feb. 22

CONTINUING their campaign for a tariff on oil, operators who have gathered under the banner of the Independent Petroleum Association of America, at the close of the third week's stay in Washington, expressed encouragement.

Wirt Franklin, Ardmore, Okla., president of the association and generalissimo of the campaign, believes the chances are good for a victory in the present session of Congress.

A bright spot in the week for the tariff advocates was the declaration by Senator Morris Sheppard, of Texas, who had refused up to that time to commit himself. In a public statement he declared that it is more than a tariff fight—that it is "the fight of the smaller business unit against the larger, the fight that is taking place in almost every branch of American business and industry—a fight which must be won by the smaller unit if the country is to be saved from economic domination by the few. It is a fight to preserve competition and repress monopoly."

Senator Sheppard also said the few big oil companies are using imports to beat down the independents. They use the privilege of bringing in oil duty free, oil that is produced and refined in foreign countries where "wages and other costs are at a level below that of a decent civilization" to reduce the price of domestic crude oil below legitimate cost of production; but, he asserted, the consumer is not given a corresponding benefit in the price of gasoline.

That point has been given wide advertising by the campaigners. In one of the statements distributed to all members of Congress, comparative prices in cities of the United States were given. These were filling station prices on gasoline, as published in the Oil Price Handbook, published by NATIONAL PETROLEUM NEWS, and compared the price in February, 1926, with that of February, 1929. Senator Sheppard took these prices in support of his contention that the consumer has not benefitted by lowered prices on crude oil, as follows:

"The average price of gasoline at the service station, less gasoline tax, in 52 cities representing every part of the country was a fraction higher in 1929 than 1926. And yet the price of Mid-Continent crude oil, the principal source of supply for gasoline, oil produced mainly in Texas, Oklahoma, Arkansas and Louisiana, was $2.04 a barrel in February, 1926, and $1.20 in February, 1929. Moreover, in 1926, the gasoline recovered from a barrel of oil was 35 per cent while in 1929 it averaged 45 per cent."

The senator from Texas found the tariff cause to fit in with the declarations of his party. He said:

"The independents are asking as a measure of self defense and self preservation merely for a tariff rate on oil and gasoline which will equal the difference in production costs here and abroad—a competitive tariff such as was advocated by the last national democratic platform."

He asserted that it is the independent competition, actual and potential, that protects the consumer. "The interest of the consumer demands that independents be preserved," he concluded. "Their continued existence will form a check on higher gasoline prices in the shape of both actual and potential competition."

The declaration by Senator Sheppard, veteran member of the upper chamber, brought great joy to the tariff-on-oil men. Given sufficient democratic support, with the support, now considered assured, of the "Young Turks" in the republican ranks, and the fight in the Senate will be over, they say. As for the House, they say new recruits to the cause are rapidly being made as the individual member gets around to consider the arguments, most of which are made in personal calls.

Two declarations were made Feb. 20 by House members, both members of the ways and means committee, which granted a hearing early in February to the delegation that came to Washington on Feb. 3. The letters, Mr. Franklin said, were unsolicited statements and are given publicity with the consent of the writers. One is from a democrat and the other from a republican. Neither writer is from an oil producing area.

Rep. Frank Crowther, republican, represents the 30th New York district, which includes Schenectady as its principal city. He wrote to Wirt Franklin as follows:

"I am strongly in favor of a protective duty on oil. In my opinion you presented a clear cut case on behalf of the independent producers. If the policy of a protective tariff is sound (and I know it is) it ought to be applicable all along the line.

"I am an old fashioned protectionist who believes that no duty is too high if it really protects an American industry, provided that said industry pays decent wages to the employes. Your industry meets this requirement, according to the testimony."

Rep. Henry T. Rainey, democrat, of Carrollton, Ill., serves the 20th district of the state. It has no oil fields. His letter is pitched upon the theme that the independent oil industry is being exhausted by the powerful companies and he has a personal reason for so believing. He wrote to Mr. Franklin:

"I have never seen a better case for tariff relief made out since I have been a member of the ways and means committee of the House of Representatives and I have been a member of that committee for 20 years. I sincerely hope the independents can get this kind of relief. If they do not it seems to me that the Standard Companies and Mr. Mel-

Gov. Holloway Takes Hand in Tariff

By Telegraph

TULSA, Okla., Feb. 25.—The announcement that Governor W. J. Halloway of Oklahoma plans to take a personal part in the campaign for an oil tariff was the feature of a pep meeting composed of tariff advocates who were oil men, local business associations and industrial leaders in Tulsa tonight.

Governor Halloway plans to leave for Washington Feb. 25 to lend his aid in the movement. He has telegraphed to Governors Moody of Texas, Parnell of Arkansas, Long of Louisiana, Adams of Colorado and Reed of Kansas, asking that they join in the movement and come to Washington to aid in the presentation of the plea for a tariff. The meeting tonight was under the chairmanship of J. G. Cloud, Tulsa oil man.

lon's Gulf company will quickly absorb the oil business.

"Until recently I owned some shares of stock in the White Eagle company—a distributing company as well as a producing company—the dividend payment was excellent and the earnings in relation to the dividend payments were better than any other oil company that I know of.

"Recently, it was absorbed by the Standard Oil of New York. We received 8½ shares of Standard Oil of New York for each 10 shares of White Eagle. I, therefore, have fewer shares of Standard Oil of New York than I had of White Eagle and the Standard Oil of New York is only paying $1.60 and White Eagle paid $2.

"The absorption of the White Eagle by Standard Oil of New York means quite a loss to me and I had nothing to say about it at all. The only reason I can see for this action by the controlling interests of the White Eagle is that they saw the approaching difficulties of the independent producers and the impossibility of competing with importing companies. The Standard Oil of New York, of course, now invades the distributing field and will probably greatly extend White Eagle distributing stations.

"This transaction, it seems to me, indicates the deplorable trend in the oil industry in this country. I am afraid the Standard Companies and Mr. Mellon's company will succeed in defeating the independents in the fight they are making. Of course, Mr. Mellon is the power behind this administration. He is interested in several companies. Every other Mellon interest has demanded an increase in tariff except the Gulf Oil Co. and his other companies are getting what they want. You could not make a better nor a more convincing fight than you are making and I sincerely hope you will win."

There is no manner of predicting even the approximate time when the oil tariff will officially be launched in Congress. It will come up when the Senate gets around to consideration of the free list. Then formal proposal will be made that oil be taken off the free list and the tariff advocates will be given a chance to make their argument. Some are guessing that about March 1 such action will be taken.

Oil Board Asks Industry For Further Figures

WASHINGTON, Feb. 24

THE Federal Oil Conservation Board has asked our industry for figures to show the shut-in production of the country but nothing very definite is offered as to the reason for the call. Secretary of the Interior Wilbur, chairman, says that the figures are needed to complete the picture showing production, volume of refining and stocks on hand and that without such figures the possibility or actual existence of waste cannot be shown.

Dr. George Otis Smith, director of the U. S. Geological Survey, says that, to get the idea of conservation by unified operation across, the government must carry on educational work; that government control or regulation is not to be thought of; and that, to carry on educational work, the officers of the government themselves must know the facts.

Secretary Wilbur gave a decided negative when it was suggested that figures about shut-in production might be used in the fight for a tariff that is being waged by the Mid-Continent independents.

The attitude of President Hoover toward the tariff proposal has not been disclosed. Managers of the tariff bill, so-called old guard Republicans, are nonplussed by reports to the effect that the President is not at all worried by the hob which they assert the irregular Republicans and the Democrats are playing with the measure his party leaders brought forward as fulfilling a campaign promise. When the tariff bill was framed it was certain that the influence of the administration would be against a tariff on oil, on the ground that free entry of crude would tend to preserve the petroleum reserves of the United States. Senator Thomas, of Oklahoma, months ago advised the Mid-Continent producers that the administration was against a duty. The "old guard" leaders, taking their cue as they supposed, from the White House, were against the duty.

The call of the Federal Oil Conservation Board for shut in production statistics seems to add to, instead of subtracting from, the uncertainty about everything pertaining to petroleum and its products, so far as Washington is concerned.

A thought has been that the board might be contemplating an utterance in respect to the petroleum situation, preparation of which called for the gathering of additional statistics. The call from the board was first sent to other branches of the government but, when only printed reports resulted from that call, the industry was asked to provide figures.

Shuman Heads A.P.I. Chapter

DRUMRIGHT, Feb. 19.—New officers for 1930 were elected and some of the reasons for, and benefits of, A. P. I. pipe specification and gas engine standardization were discussed at the regular monthly meeting of the Drumright chapter of the American Petroleum Institute Division of Production, held in Drumright the evening of February 18.

Charles Shuman, Sinclair Oil & Gas Co., was elected chairman, succeeding Watson Bettis, Gypsy Oil Co. W. R. Danforth, Shaffer Oil & Refining Co., is the new vice-chairman, succeeding C. E. Carl, Shaffer Oil & Refining Co.

E. L. (Ernie) Bell, Shaffer Oil & Refining Co., was continued as secretary of the chapter. The opinion expressed by the members of the chapter was that could Mr. Bell be persuaded to accept it, he could have the secretaryship as a life time job. It was felt that largely through his unceasing efforts the Drumright chapter has become perhaps the most closely knit and widely known of the field chapters of the A. P. I. field division.

D. L. Trax, Gypsy Oil Co. will remain as advisor to the Drumright chapter, it was announced.

In addition to the regular officers, a board of directors was created. The duties of the board will be to assist the chairman in selecting and arranging the programs, greeting visitors, and in general to help out wherever they can in the conduct of the organization. The board consists of the following men: L. A. Cook, Shell Petroleum Corp.; E. R. Pitcher, The Texas Co.; T. A. Newton, Twin State Oil Co.; R. C. Woodruff, Mul-Berry Oil Co.; J. G. Bischoff, Shaffer Oil & Refining Co.; John Allspough, Prairie Oil & Gas Co.; E. D. Smith, Magnolia Petroleum Co.; W. B. Allman, Tidal Oil Co.

H. G. Texter, of Spang, Chalfont & Co., gave a short talk on A. P. I. pipe. He outlined the various tolerances which the A. P. I. specifications allow the manufacturer, and explained the necessity for these tolerances.

John Reid, of the Joseph Reid Gas Engine Co. spoke briefly on the extent of standardization and what it had accomplished in the gas engine field. Standardization in this line he said, has worked toward the use of all engines of the same size, regardless of make, with the equipment on hand. Fly wheel flanges, foundation bolt sizes, gas and air intake and exhaust outlets are better standardized as this makes it possible for the operator who takes over a property developed by another to use a lot of the equipment which he has standardized on regardless of the make of engines which he finds on the property when he takes it over.

What Brings Success to Independents Discussed at Ohio Meeting

By Roger B. Stafford
N. P. N. STAFF WRITER

COLUMBUS, O., Feb. 22

SIX principles of salesmanship were laid down by Frank W. Lovejoy, general sales manager, Vacuum Oil Co., New York, at the annual meeting of the Ohio Petroleum Marketers Association here this week. The principles are:

"1. Don't talk too much. Selling is not selling somebody something, but having somebody buy.

"2. Don't interrupt. If you get a prospect talking, he'll soon be taking an order book out of your hand.

"3. Avoid the argumentative manner. Never make a sale through facts. Facts don't make a sale. It's only the dramatic presentation of facts that sell.

"4. Inquire first and attack afterward. Don't try to inform a man on something he is already convinced about.

"5. Convince the prospect that you understand what are his objections.

"6. Concentrate on one key issue. The human mind can grasp only one thing at a time."

Mr. Lovejoy predicted that the lease and license contract would eventually disappear and the Independent marketer would continue. He also said he did not believe the one-stop service station was the ultimate method in marketing of petroleum products to the automobile trade. But they are a backlog, he added.

Kenneth Cloud, Irving-Cloud Publishing Co., Chicago, said 6000 one-stop service stations had been built in 1929 in the United States and 9000 in the last two years. This number included tire and battery dealers, and garage operators that had diversified their services.

Five 10-minute talks were given by four Ohio oil men and one woman.

E. H. Jaeger, Fremont Oil Co., Dayton, in a discussion of the gasoline tax, argued that it promoted the sale of gasoline by eliminating bad roads, narrow roads, narrow bridges, and road congestion, all of which retard the sale of gasoline.

Three factors promoted sale of gasoline, Mr. Jaeger said: 1, prosperous times; 2, weather, and 3, good roads. Oil companies can contribute to the first factor by improving their own businesses, he explained. The second factor is uncontrollable, but the third is possible through taxes. However, oil companies should see that taxes are not raised to a point where they retard the sale of gasoline. The companies should see that all the taxes are collected as protection against unfair competition.

In a discussion of Mr. Jaeger's talk, P. C. Conder, Indian Refining Co., Dayton, said the oil companies would not be menaced by rising gasoline taxes if farmers were forced to pay taxes on the gasoline they use. Under the Ohio law, taxes are refunded on gasoline not used on the public roads, but it is the opinion of many oil men that much tax-free gasoline reaches the public roads.

Mr. Conder also said oil companies should see that gasoline tax receipts are spent for the purpose for which they were collected. Among some applications of gasoline tax receipts in Ohio not provided for under the tax laws, were the building of a $100,000 embankment for the Scioto river at Columbus and the laying of sewers in Lima.

J. Roger Day, Day Bros., Edgerton, O., in a talk entitled, "We Are Going But by What Route?" said the marketing division of our industry had not been weaned from many obsolete practices. He blamed the difference in gasoline prices across state lines as a cause for the establishment of cooperative oil companies. He cited the situation in northwestern Ohio, where the tank wagon price is 20.4 cents on the Indiana side of the state line and 16 cents on the Ohio side. He said 69 cooperative oil and gasoline stations had been set up in Indiana largely because of the differential. The taxes are the same in each state and Indiana has a lower freight rate from the supplying fields.

Premiums leave a bad taste in the mouths of local merchants, Mr. Day said. He asked marketers what they would think of a merchant who would put a pump on the curb in front of his store and sell gasoline at cost?

Mrs. Edna Wolff, Purity Oil Co., Napoleon, pleaded for observance of the code of ethics and support for the officers of the state association. Mrs. Wolff placed marketers into three groups: majors, Independents, and illegitimates.

Major competition is good competition, she said, but the majors often put the illegitimates in business by giving them equipment free. The Independents seldom supply the illegitimates with oil and gasoline, she said.

Major companies don't cut prices at their own stations, but their illegitimate dealers do, Mrs. Wolff said. She explained that the agent of the major company had to make a sales quota and if he had difficulty he was not particular where he placed his company's goods.

"The Independent, regardless of the quality of his goods, cannot compete with the illegitimate," Mrs. Wolff asserted. "That is a reason why the code should be signed and you should check up on its observance in your own territories."

S. E. McFarren, C. A. Pierce Oil Co., Akron, 1929 president of the Ohio association, commented that he believed major companies were beginning to accept responsibility for the acts of their dealers.

The Citizens Oil & Gas Co., Canton, cut credit extension from 143 accounts when it found its "liquid assets "frozen" and lost the business of only 21 accounts; the remainder became cash or limited credit customers, Frank Samuel of that company told the Ohio men.

Too much money is being tied up in 90, 120 and 150-day credits, Mr. Samuel warned. Tell the customer how and when he must pay when he buys, and don't sell a thing unless you can sell it at a net profit, Mr. Samuel advised.

Free service to "get over" with the motoring public must be given willingly and not mechanically, Jim Stevenson, formerly of the Vahey Oil Co., Youngstown, told the convention. He also warned against superselling, because it tends to alienate customer goodwill. He cited as an example the old-time barber who lost friends by trying to sell too much service.

Mr. Stevenson said the average "red-blooded" American did not like to have a mob of station men swarm over his car, the station manager smile and say: "How do you, sir. May I fill your tank, sir?"

He recounted the growth of free services with the growth of competition among gasoline stations. He concluded that some stations overdo free service and some underdo it.

George French, Sinclair Refining

Co., New York, advised more work and less play, minor fights and cut-throat competition as the need of the marketing division. He said three times as many outlets as were needed had been created by the oil industry, but the phase of rapid expansion was nearing an end, and the jobber, rather than the refiner, would be the person to handle the marketing end.

These directors were elected: W. F. Burke, Kentucky Independent Oil Co. Cincinnati; P. C. Conder, Indiana Refining Co., Dayton; W. F. Dailey, Shell Petroleum Corp., Lima; R. R. Hart, Knox Oil Co., Mt. Vernon; W. H. Hartley, Hartley Oil Co., Cambridge; R. R. Lanning, Crystal Rock Gas Co., Logan; W. M. Lyden, Lyden Oil Co., Youngstown; S. E. McFarren, C. A. Pierce Oil Co., Akron, and Charles McLean, Canfield Oil Co., Cleveland.

Mr. Burke was elected president; Mr. McFarren, first vice-president; Mr. Conder, second vice-president, and Mr. Lyden, third vice-president. W. A. Milne was reelected executive secretary, and R. W. Palmer, Columbus, treasurer. Hubert B. Fuller, Cleveland, was retained again as counsel for the association.

Agency Agreements Are Means to Violate Spirit of Code, Is Charged

COLUMBUS, Feb. 22

MISUNDERSTANDINGS and suspected violations of the code of marketing practices were aired Feb. 21 at the final session of the three-day annual convention of the Ohio Petroleum Marketers' Association in Columbus.

What result this airing will have, can be ascertained only in the future when it can be learned what part of the 18 or 19 per cent of Ohio's gasoline gallonage that is now being marketed outside the code, is brought under the scope of that agreement.

H. T. Klein, general counsel of The Texas Co. and chairman of the A.P.I. national committee on interpretation of the code, outlined the development of the anti-trust laws, and the early efforts to obtain a code of marketing practices for the petroleum industry. He then told of the conferences and work connected with the code that was promulgated last July.

When questions were asked for, the dirty linen was brought out for airing.

R. K. Schoolroy, president of the Allegheny-Arrow Oil Corp., Canton, charged that the lease and agency contracts permitted under the codes were mere evasions to permit the giving away of more equipment than was permitted in the letter of the code, and to cut the market prices without posting the price cuts as provided in the code.

Previously Mr. Klein had given the following points in defense of the lease and agency, expressions in opposition to which he evidently had expected:

1. They tend toward stabilization of market structures.
2. They eliminate or minimize split account evils.
3. They give control of prices to the supplying persons or companies.
4. They permit more economical marketing practices by eliminating wasteful competitive methods.

Mr. Klein said perhaps the greatest benefit to be derived from the code was that it permitted conferences at which distributing companies might get together to settle their differences and grievances, but not to discuss prices.

He emphasized several times, as did W. A. Milne, executive secretary of the Ohio association, that the code had nothing to do with prices but only with practices. Confusion of prices and practices has been perhaps the greatest deterrent to getting signatures under the code, because the smaller marketers are suspicious of what prices the larger companies may post any time or what practices may be adopted which, the smaller marketers suspect, may be made to squeeze competition.

In this connection Mr. Klein, answering a question and statement of a case presented by Jim Stevenson, Youngstown, said that the lowering of the price structure and narrowing the margin of operating revenue to a point where Independent marketers could not meet the competition, might be construed as unfair competition in restraint of trade and prosecuted as such.

MR. SCHOOLROY charged that the lease and agency might be a subterfuge to evade the spirit of the code because, when a station was leased and the owner made an employe or agent of the lessee, the code did not apply to what equipment. even underground equipment, could be put in free.

Mr. Klein said that the interpretation that the lease must be for a term of at least one year, was intended to eliminate this form of evasion. Also the requirement that leases should be recorded, was a safeguard against evasion, he said. Mr. Schoolroy then pointed out that it was unnecessary in Ohio to record leases to make them legal unless they were for terms of three years or longer.

Mr. Milne said there had been considerable neglect or evasion of the spirit of the code in posting prices at bulk stations. Some prices had been posted behind doors, in toilet rooms and other places where one would not look for the posting ordinarily. The code, Mr. Klein pointed out, provided for the *conspicuous* posting of all prices required to be posted.

These points were brought out in the questioning:

Airport equipment may be substituted free wherever it was installed free before the adoption of the code. No formal opinion has been given by the institute on this point, Mr. Klein said, and his interpretation was personal and not that of other members of the national committee. The airport question was raised by W. A. McAfee, general counsel of the Standard Oil Co. of Ohio.

Verbal promises to supply dealers with free equipment to induce them to sign lease and agency contracts have no legal standing—a point raised by P. C. Conder, Indian Refining Co., Dayton.

Price concessions granted in contracts made after Aug. 31, 1929, must be posted—in answer to a question by R. D. Sprague, National Refining Co., Cleveland.

In connection with the answer to Mr. Sprague's question Mr. Schoolroy stated that a great deal of the suspicion held by Independent marketers was caused by the activity of major companies in signing contracts with concessions just prior to the effective date of the code. The Independents considered such activity a breach of good faith, he asserted.

Practice of supplying farmers with gasoline buggies or other rolling equipment as an evasion of the rule providing for payment for installa-

tion of underground tanks, was held a code violation.

Premiums, goods sold below their normal retail price as an inducement to get gasoline or oil customers, was held a code violation.

Mileage indicators or devices of value that are lent car owners to induce them to patronize some particular station or company, were held to violate the code. This informal interpretation did not apply to the ordinary stickers used to show mileage, it was explained.

Answering a question as to what constituted an unfair trade practice mentioned in the federal trade commission act, Mr. Klein cited for B. Berman, Commonwealth Oil Co., Cleveland, a decision of the U. S. Supreme Court in which these four general unfair practices were given: 1. Deception; 2. Bad faith; 3. Fraud; 4. Oppression.

At a business session previous to the code session, Mr. Milne, who is chairman of the Ohio committee charged with getting signers to the code, said that 210 individuals, firms or corporations had signed the code in Ohio and this number marketed 81 per cent of the gasoline in the state. Not all of the signatures have been sent to the Federal Trade Commission but many are still held in the offices of the Ohio association. Definite action was not taken as to the disposition of the names at this convention.

Governor Lowers Oil Inspection Fee

CLEVELAND, Feb. 25.—Fees for the inspection of gasoline and kerosene in Nebraska have been cut in half by executive order of Governor Weaver according to a report from C. M. Sutherland, secretary of the Nebraska Independent Oil Men's Association. The fee now will be 1½ cents per barrel instead of 3 cents per barrel.

The fee reduction will save Nebraska jobbers $75,000 a year. In 1929 the state inspected 27,849 cars of gasoline and 5229 cars of kerosene. In 1928 inspection was made of 24,870 cars of gasoline and 4429 cars of kerosene.

The governor's action was taken to avoid a suit by the Nebraska association. Two times previously the law has been attacked when inspection fees exceeded the cost of inspection. Each time the law was held unconstitutional and the legislature passed a new act charging lower fees.

H. J. Siemer, Veteran Ohio Jobber, Dies

CINCINNATI, Feb. 20.—A veteran of Ohio's oil marketers died here Feb. 18. He was Henry J. Siemer, 69, founder and president of the Merchants Oil Co., also a charter member and director of the Ohio Petroleum Marketers' Association.

Mr. Siemer was in the oil business approximately 45 years and was active in it until his health failed a little longer than a year ago.

The Merchants Oil Co. was organized in 1911 and is being directed now by his son George Siemer. Previous to the formation of the Merchants, Mr. Siemer was superintendent of the Cincinnati Oil Works for 25 years.

So high was he held in the esteem of his fellow oil men in Cincinnati that at least one competitor is reputed to have issued instructions to its salesmen that no business should be taken from Henry Siemer.

The funeral was held Feb. 20 and services were conducted by the Masonic order.

* * *

COLUMBUS, Feb. 21.—Resolutions in memory of Henry J. Siemer of Cincinnati, a director of the Ohio Petroleum Marketers Association since its organization eight years ago, were adopted at the annual convention of the association here today.

Display Goods to Create Demand, Minnesota Jobbers Told

MINNEAPOLIS, Feb. 21

THROW out the loafers' seats, display your goods where the customer will see and want them, clean up your stations, and paint your pumps a bright red, so members of the Minnesota division of the Northwest Petroleum Association were told in convention here Feb. 19 and 20 by R. M. Ward, supervisor of lubrication sales for the Skelly Oil Co., Eldorado, Kan.

Ten fundamentals on merchandising as outlined by Mr. Ward are:

1. Have a modern accounting system. Find out the facts about your business, your profits monthly; your overhead; the cost of deliveries.

2. Know your trade territory. Get a map of your territory, drive over all roads, and list every farm. Find out the number of autos, trucks, tractors, and fleets, number of outlets; and how much of the business are you getting.

3. Keep your stations and trucks attractive. Clean up the station and dust off the package goods. Paint pumps a bright red, paint the sides of the pump islands daily if necessary. *Keep your toilets clean.* Throw out the loafers.

4. Display goods at the stations and on trucks so they will be attractive. Display goods in station windows and on pump islands. Use chain store methods in making your customers want the goods.

5. Train employees to know everything about everything they sell.

6. Train men to sell on the job.

7. Pay commissions. Give the men a salary and make the commission worth while. Let them know daily where they stand; create competition among employees.

8. Advertise to increase local demand for your products. Use the local newspapers, direct mail pieces, follow up systems, and real roadside signs.

9. Sell your goods. Ask a fair price and expect to get it.

10. Take advantage of your biggest asset—that you are a local business man.

The board of directors re-elected officers for the coming year: E. C. Laughlin, Sterling Oil Co., Minneapolis, president; J. H. Burmeister, Faribault Oil Co., Faribault, Minn., vice-president for Minnesota; R. J. Coughlin, Westland Oil Co., Minot, N. D., vice-president for North Dakota; J. P. Deegan, Northwestern Oil Co., Superior, Wis., vice-president for Wisconsin; J. M. Wolf, Cities Service Oil Co., Fairmont, Minn., treasurer; and Elwin E. Hadlick, secretary.

Directors elected for the three year term were Mr. Burmeister re-elected; and S. E. Smith, W. H. Barber Co., Minneapolis; A. M. Clark, Bartles Scott Oil Co., Willmar; and J. V. Quinlan, Reed-Hynes-Quinlan Co., Hibbing. A. R. Souba, Graceville Oil Co., Graceville, was elected a director for one year.

Registration was 250 members. Eight equipment manufacturers exhibited.

Other speakers on the program were R. J. Stevenson, lubricating engineer, Shell Petroleum Corp., St. Louis. He illustrated the various oil tests, and presented comparative data on the results of tests on various base oils.

President Laughlin opened the convention with an address of welcome. Following was a discussion on the code, led by Mr. Hadlick. Lease agreements and trading stamps were the most discussed marketing points in the code discussion.

C. C. Wagner, Dacotah Oil Co., Madison, S. D., spoke on the relation of chemistry to the oil industry.

Entertainment consisted of luncheon each day, and the annual banquet on the final evening.

Seaboard Midland 6000-gallon tank truck and trailer. Signs on the sides are removable and can be replaced with signs bearing the name of the customer

Carries 6000 Gallons of Gasoline And the Customer's Signs

NEW YORK, Feb. 22

THIS is a story about advertising, tank truck advertising. Not the kind of tank truck advertising the phrase implies, but an entirely different feature, one whereby the company's account benefits.

The accompanying photograph was taken at the Curtis Bay, Md., plant of the Seaboard Midland Petroleum Corp. and the Seaboard Terminals Corp., of Baltimore. Note that the tanks on the truck and trailer are free from lettering. Also note the foot-high signs attached to the "cat walk."

In July, last year, Vice President J. I. Hopkins, in conference with other Seaboard officials, decided a truck and trailer carrying tank of more than ordinary capacity would be an asset to the business; that it would permit the company to transport gasoline more cheaply than it could be shipped by rail.

This six-wheel, six-cylinder Mack truck, the largest ever delivered by the Mack people east of the Mississippi, according to Mr. Hopkins, was the outgrowth of that conference. With the trailer it has a capacity of 6000 gallons.

Company officials were not content to rely on the quality of gasoline which they handled to put this new service across, so they cast about for some other attraction which would promote in the buyer's mind the desirability of getting shipments by truck. Thus the unique plan was evolved of advertising the name of the buyer or his company on each load of gasoline he bought.

The buyer can name his own type of sign the truck carries as long as it remains within reasonable proportions as to size. Some of these signs are in gay colors. Some adopt the color scheme of the customer's stations. Others are lettered in black on a plain white background. Some are made of canvas, painted and stretched over a wooden frame. Others are more elaborately stamped on metal with raised letters.

"It means something to the buyer," Mr. Hopkins said, "to have the truck carrying his sign cruising down the main street of the town where he does business and on the main highways outside the corporation limits.

"A further argument for truck delivery is that a buyer eliminates transportation for which he must pay in moving the gasoline from a tank car storage to this station."

Most of the customers which take this kind of delivery, Mr. Hopkins said, do not have underground tanks large enough to accommodate the entire contents of a tank car at one time. Therefore, the 6000 gallons which the truck carries is more in line with their requirements, particularly since it can be delivered at several stations.

The truck dumps the 6000 gallons through three-inch discharge lines in 40 minutes actual dumping time. Since the purchase of the truck quite a large business has been developed, which keeps the driver busy from early in the morning until late at night. Only on days when the weather is extremely bad has the truck been laid up. During the coming summer two drivers will work it, keeping it going day and night if business warrants.

The territory which the truck serves has grown from the comparatively small area around Baltimore to a section taking in southern Pennsylvania, as far west as Hagerstown, Md., and Chambersburg, Pa., north as far as York and Lancaster, Pa., and the entire state of Maryland. There is one exception—no gasoline has been delivered into Washington for the reason that a bridge must be crossed which will not support the total weight of the unit.

Mr. Hopkins' largest buyer is H. F. Brown, of Frederickstown, Md., who operates 20 stations, all equipped to handle deliveries from the truck.

S. O. New Jersey Gives Its Reasons For Reducing Crude Prices

A DEFENSE of its recent action in reducing the price of crude oil in the Southwest is given by the Standard Oil Co. (New Jersey) in the current issue of *The Lamp*, company house organ. The company contends that it is not interested in depressing crude since its own producing activities are so large that it suffers by any such reduction.

Citing reductions in refinery markets the company asserts that no industry can continue over any extended period to pay more for raw material than finished products will sell for. Following is the article from *The Lamp* in full:

Criticism of the revision by companies affiliated with the Standard Oil Company (N. J.) in the posted price of crude has been expressed by producers and others. It has been represented that the revision was not justified by conditions and that it would cause the withdrawal of support from the conservation movement. The Standard Oil Co. (N. J.) accepts these expressions as sincere and in the interest of conservation sets forth the situation which forced this action.

Whatever difference of opinion may exist as to the responsibility for the surplus stocks overhanging the markets, there is a unanimity of view that these stocks are oppressively large and that if they continue to increase they will materially affect the result of this year's operations. Stocks of gasoline in storage increased in 1929 to a total of 43,000,000 barrels at the end of the year. In January they were further augmented and the process of accumulation continues.

Such a situation plainly forecasts a repetition of the experience of previous years when excessive runs to stills in the winter months reacted adversely upon the gasoline market during the season of large consumption.

The Standard Oil Co. (N. J.) through its affiliated companies, in addition to its own production, is purchasing each day large quantities of crude oil at the posted prices. On the other hand, a number of the other companies with refineries on the Gulf or in the Mid-Continent field are producers of crude in an amount equal to or in excess of their own refinery runs. They are, therefore, more concerned with the posted price of crude as sellers than as buyers. These producer-refiners have been able to sell products at prices below the equivalent of the posted price of crude at the wells plus transportation and manufacturing cost.

When refinery runs exceed market needs and create a surplus of products sufficient to depress the wholesale price of gasoline, the value of crude is being reduced even though the posted price is unchanged. This is what happened: On June 7 last the weighted average wholesale price for U. S. Motor gasoline in Group Three (Oklahoma) as reported by Platt's "Oilgram" was 9.25 cents per gallon. At the time of the revision in the posted price of crude on Jan. 15 the price as reported by the same authority had declined to 6.58 cents—a reduction of 2.67 cents per gallon.

The Bureau of Mines reports an average yield from Mid-Continent crude of more than 21 gallons of gasoline per 42-gallon barrel. Therefore, with no change in the posted price, the actual value of this grade of crude had been reduced 56 cents per barrel by the decline in the wholesale price of gasoline.

Fluctuations in the price of crude and all other commodities are not ultimately controlled by individuals and corporations, but by conditions. The economics of any business may run contrary to the general trend of prices of raw material and products for a time, but in the end such an unsound condition must succumb to correction by the law of supply and demand.

Since the only measure of the value of crude is the price realized for the products, the companies affiliated with Standard Oil Co. (N. J.) found it necessary to adjust their posted prices at which they would purchase crude to a gasoline market that had been steadily declining.

The Standard Oil Co. (N. J.) believes that conservation and the prosperity of the industry cannot be realized while additions are being made to the already burdensome stocks, and that the immediate problem before the industry is to effect a material decrease in the present surplus stock of gasoline. This company's operations are in balance, and its stocks of gasoline as well as crude are less than they were at this time a year ago.

THIS company is not now, and never has been, interested in depressing the price of crude oil. Its producing investment is of such size that the company is seriously affected when posted prices for crude are at an unremunerative level. But by virtue of its activities as a merchant this company is keenly aware of the unescapable fact that the prevailing price of a barrel of crude cannot be for any considerable period more than the total realization from the sale of the products obtained therefrom.

We believe in conservation in the interest of the public and the industry and stand ready to cooperate to the fullest extent in any workable plan to this end. For conservation to be effective, the refiner and producer must each do his part.

Drilling, Stocks and Imports

The widespread discussions over the recent crude oil price revision that have taken place wherever oil men gather have given rise to many erroneous statements bearing on the extent to which the Standard Oil Co. (N. J.) has adhered to its announced policy of limiting its production and manufacturing activities so far as possible to the current market requirements.

This company has from the outset carried on its operations in accordance with the conservation movement and has announced an operating policy that would keep its own stocks of gasoline below 1929's level. To clear up misunderstandings as to just what this company has done and to present the facts we give herewith a summary of the actual situation of the company's operating domestic subsidiaries as of the latest date for which facts are obtainable at this writing.

As to wells drilling, the affiliated companies of Standard Oil Co. (N. J.) were running on Jan. 1, 1930 a total of 89 rigs in the several states in which these affiliated companies operate. The total number of wells drilling in the United States was 4468.

We publish below actual inventories of all New Jersey's affiliated companies in the United States as of Feb. 7, 1930 and the corresponding figures for the same day in 1929, together with the decrease shown in this period of general additions to storage:

	Barrels		
	Feb. 7, 1930	Feb. 7, 1929	Decrease
Naphtha (finished & unfinished)	8,290,264	8,323,375	34,111
Other products	17,970,879	18,302,460	331,581
Total products	26,261,143	26,626,835	365,692
Crude	45,382,748	46,188,351	805,603
Total crude and products	71,643,891	72,815,186	1,171,295

In figuring a true production comparison, imports must also be taken into account, since even a substantial

reduction in domestic crude might be offset through increased shipments from South America and Mexico. In 1928 the companies affiliated with the Standard Oil Co. (N. J.) imported a total of 30,342,000 barrels of crude and products. For the year ended December 31 last these same companies imported 27,971,000 barrels, a decrease of 2,371,000 barrels.

Baldwin Elected Head Of S. D. Jobbers

Cleveland—A. J. Baldwin, Baldwin Oil Supply Co., Lake Preston, was elected president of the South Dakota Independent Oil Men's association at the convention in Sioux Falls, S. D., Feb. 13 and 14.

C. C. Wagner, Dacotah Oil Co., Madison, was elected vice-president, and F. H. Buehler, Dacotah Oil Co., Madison, was elected secretary-treasurer. Mr. Buehler, who has been secretary since the organization was founded 11 years ago resigned but accepted re-election for several months until a successor could be obtained.

Directors elected were E. R. Teitz, Huron Oil Co.. Huron; J. H. Cumbow, Cumbow Lanning Oil Co., Sioux Falls; and Ben Wilson, Service Oil Station, Watertown.

The code of ethics was endorsed officially, and all members present signed. C. M. Sutherland, secretary of the Nebraska organization, spoke on the code. Mr. Buehler is state chairman of the code committee.

In recognition of his service a Gladstone bag was presented by the association to Mr. Buehler.

Eastern A.I.M.E. Section To Meet April 7

PITTSBURGH, Feb. 22.—The Eastern section, American Petroleum Institute division of development and production engineering, will hold a one day meeting in the William Penn Hotel, Pittsburgh, April 7 in which subjects of practical application will be discussed.

One of the most timely is that on economies in operating small wells. P. H. Curry, vice-president of the South Penn Oil Co., who has had many years of experience in the management of fractional-barrel per day wells, will be the speaker on this subject.

S. W. Meals, president of the Carnegie Natural Gas Co., will talk on the storing of natural and artificial gas in old, depleted oil and gas fields. Eugene A. Stephenson and H. K. King, of the Ralph E. Davis engineering firm, will discuss core studies of Appalachian fields. Oil and gas reserves of the eastern fields will be the subject of a talk by Mr. Pierce, of the firm of Dunn & Lewis.

California Production Cuts Announced

By Telegraph

LOS ANGELES, Feb. 25.—Ten per cent of the Santa Fe Springs operators have not agreed to curtailment measures. Potential productions following flush fields are to be cut 43 per cent to give allowable output. Santa Fe Springs with a potential of 262,284 barrels per day will be cut to 149,502, Long Beach from 156,880 barrels to 89,422, Ventura Avenue from 74,170 barrels to 42,277, Elwood from 64,579 barrels to 36,810, Seal Beach and Alamitos Heights from 41,053 barrels to 23,400, Kern Front from 22,600 barrels to 12,882, Mount Poso from 17,600 to 10,032, Round Mountain from 5,800 to 3,306, Maricopa from 20,000 to 11,400.

This cuts potential production of flush fields from 664,966 to allowable of 337,031 barrels. Group 2 consisting of remaining fields with the exception of Kettleman Hills is to suffer a 40.76 per cent cut reducing potential of 365,422 barrels per day to 216,464 barrels per day. Kettleman Hills with potential of 65,000 to be cut 79.2 per cent giving allowable of 13,500. Total potential for the state to be cut 44.4 per cent from 1,095,386 barrels per day to give allowable 608,995 barrels per day by close.

Three Companies Report More Stockholders

CLEVELAND, Feb. 21.—Increases in the number of stockholders since the October collapse of the stock market have been reported by the Amerada Corp., Barnsdall Corp., and Independent Oil & Gas Co. A list of increases in many other companies was published by NATIONAL PETROLEUM NEWS for Jan. 22, 1930, page 122.

Amerada Oct. 15, 1929, had 2972 stockholders and Jan. 15, 1930, had 3457, an increase of 485.

Barnsdall had 8432 Oct. 7 and 11,618 Jan. 15, a gain of 3186.

Independent reports an increase of 33 1/3 per cent in the number of stockholders in the three months ended Jan. 15, with 80 per cent of the increase coming since the middle of November.

The increase in the number of stockholders since the collapse has been interpreted to mean the public has confidence in the petroleum industry.

Gas Tax Suit Decided

By Telegraph

WASHINGTON, Feb. 25.—Mississippi had the right to impose a gasoline tax on sales made by distributors in Mississippi to companies in the same state who were under contract to supply gasoline to fishermen operating in Louisiana, the Supreme Court held on February 24, in a case entitled Superior Oil Co., vs. Mississippi.

Such sales did not constitute interstate commerce, the court ruled. The gasoline was in the hands of the purchaser to do with as he liked. The opinion pointed out and there was nothing that in any way committed him to send the oil to Louisiana.

American Petroleum Institute report of refinery operations in the United States for the week ended Feb. 22, compared with the week ended Feb. 15

Districts	Per Cent of Capacity Reporting	Daily Av. Crude Run to Stills Wk. Ended Feb. 22 (Barrels)	Daily Av. Crude Run to Stills Wk. Ended Feb. 15 (Barrels)	Per Cent of Reporting Capacity Operated Wk. Ended Feb. 22	Per Cent of Reporting Capacity Operated Wk. Ended Feb. 15	Stocks Reported in Thousands of Barrels: Gasoline Stocks Feb. 22	Gasoline Stocks Feb. 15	Gas & Fuel Oil Stocks Feb. 22	Gas & Fuel Oil Stocks Feb. 15
East Coast	100.0	452,200	437,200	74.7	72.2	8,409	8,195	6,244	6,807
Appalachian	91.0	80,000	85,700	68.6	73.4	1,656	1,601	654	665
Ind.-Ill.-Ky	98.6	275,500	323,300	77.6	91.0	7,601	7,325	2,960	2,998
Okla.-Kan.-Mo	89.1	282,800	275,500	68.7	66.4	4,650	4,552	3,104	2,990
Texas	90.3	600,600	556,100	85.5	79.1	7,853	7,610	12,107	12,308
La.-Ark	96.8	179,900	185,900	68.7	71.0	2,772	2,623	1,401	2,325
Rocky Mountain	93.6	57,300	57,600	41.1	41.7	2,831	2,757	1,036	1,033
California	96.3	572,900	565,600	66.3	63.5	15,798	16,011	109,402	109,640
Total U. S.	94.7	2,501,200	2,486,800	72.4	71.4	51,570	50,674	136,908	138,793
Texas (Gulf Coast)	99.4	459,800	428,100	87.8	81.8	6,768	6,564	9,479	9,670
La. (Gulf Coast)	100.0	116,300	125,700	78.8	85.2	2,440	2,277	1,401	1,576

Review of Late Production News

ONE of the largest increases in daily average production in many months occurred the week ended Feb. 22 when the country's daily output went up 69,100 barrels, to 2,722,050 barrels, according to the American Petroleum Institute.

Four fields in California where open flow tests were being made accounted for most of this gain. They are Santa Fe Springs, Ventura Avenue, Long Beach and Seal Beach which gained a total of 79,000 barrels on daily average. Elwood-Goleta decreased 22,000 barrels, bringing California's total output to 806,000 barrels daily, a gain of 55,000 barrels over the previous week.

Total new crude supply amounted to 3,049,765 barrels, to which is added a 72,285 barrel increase in crude oil imports, which totaled 327,715 barrels daily the past week. Total new supply shows a gain of 141,385 barrels over the past week.

Oklahoma output gained 14,100 barrels, the Earlsboro pool gaining 15,400 barrels. East Little River gained 2800 barrels, while Allen Dome fell 3250 barrels.

Current production in this country by pools is found on page 97.

California

DUE to the increase in production on the Pacific Coast as the result of flow tests made to establish actual potentials, it was estimated that the daily average output for week ended Feb. 22 was 795,200 barrels or an increase of 31,300 barrels over the estimate for the previous week.

Conservation leaders in California were handed quite a jolt when results of the six-day flow test of the flush fields became known. With the deep sand wells wide open, Santa Fe Springs failed to exceed 265,000 barrels daily although it had had an estimated possible daily output of 370,000 barrels, so that where several operators were thought to have considerable production shut-in these tests show that they were flowing their wells practically wide open.

A potential of 1,095,386 barrels has been set for the state and present proration plans call for a reduction to 611,000 barrels, or a uniform curtailment over the state of 44 per cent.

Oklahoma-Kansas

SEVERAL new wells in the Oklahoma City pool added to the growing potential of the field, which is now estimated as close to 800,000 barrels per day. With 71 drilling wells below 6000 feet the chances of its taking a sudden turn upward are strong enough for the operators to schedule a meeting for Feb. 24 to discuss ways and means of curbing the daily output still more.

The discovery wells in the area south of Earlsboro were opened up after their agreed 16-day shut down, and performed in a manner to indicate the possibilities of an important pool. One of them made 1600 barrels in six hours.

Reports from the Voshell pool of McPherson county, Kansas, placed drilling wells along the west edge of development low enough structurally to indicate the limit of the pool.

Wyoming, Montana

WITH the advent of more favorable weather conditions there is a renewed activity in drilling operations in the various oil and gas fields in the Rocky Mountain region and in wildcatting in particular. There are now approximately 500 tests under way in the Rocky Mountain states. Twenty rigs are going up in the new international field near Coutts, Alberta.

There is no longer any doubt about the long pipe line for natural gas from northern Wyoming to Butte, Montana, being laid next summer. The line will be 310 miles long and cost in the neighborhood of $20,000,000. It will be laid by the Hope Engineering Co. and the gas will be furnished by the Ohio Oil Co., the Midwest Refining Co., the Prairie Oil & Gas Co., the Producers & Refiners Corp., Cranfill & Reynolds and the Kinney-Coastal Oil Co. Preliminary survey of the route has been completed and work will start at once.

Texas, New Mexico, Louisiana

ECTOR county's future influence on West Texas production is certain to result from construction of pipeline facilities announced through the week. After arranging for the Magnolia Petroleum Co. to handle common carrier shipments of 5000 barrels of crude daily from the Judkins area to the Big Spring refinery of the Cosden Oil Co., Inc., the J. S. Cosden interests of Fort Worth announced the Magnolia would build a nine and a half mile spur connecting their properties with its West Texas trunk pipeline within 30 days.

It had been previously announced the Burford Oil Co., operating a plant at Pecos City, would handle 1500 barrels daily, or more, oil from Landreth Production Co. properties through a 4-inch pipeline it is completing to connection with its Winkler system.

Shell Petroleum Corp., through its affiliated pipeline, is considering a spur connecting the Judkins area with its West Texas system in Crane county. A contract made with the Landreth interests, when the Shell took over a short pipeline and storage oil in the Girvin district of Pecos county recently, called for delivery of 10,000 barrels daily to Shell from the Pecos and Ector areas. Ector county's potential production now approximates 8000 barrels daily from five completed wells in a non-prorated area where active development has been forced by University land conditions.

Operations were quiet elsewhere in Texas and in southeastern New Mexico. In Gulf Coastal Louisiana, two more good wells have been completed on the Port Barre salt dome, near Opelousas, St. Landry parish. Gulf Refining Co. of Louisiana got 2300 barrels initial production in No. 1 La Haye at 3380 feet and The Texas Co.'s No. 4 Botany Bay came in for 1500 barrels at 3425 feet.

Ignited Refinery Gas at New Jersey Plant Brings Death to Eleven

NEW YORK, Feb. 21

REFINERY gas, escaping from a break in a pipe where it connected with a T fitting, just before its introduction for treatment in the alcohol plant of the Standard Oil Co. of New Jersey, near Elizabeth, N. J., became ignited and 11 workmen at the plant were injured so they died within a comparatively few hours. About 50 others were burned. The catastrophe occurred shortly after four the afternoon of Feb. 18.

The trouble started with a break in the gas line, which break had been noticed almost at its inception and the usual precautions taken to prevent escape of the gas. Such breaks are an ordinary occurrence around refining plants.

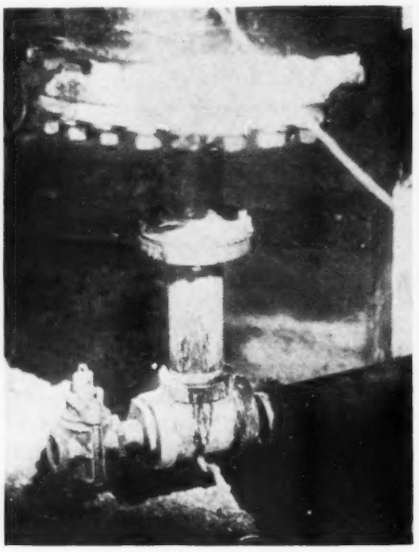
The loss of life was caused by an unusual chain of circumstances. A moderate wind brought about carburetion of the gas with air until an explosive mixture was formed and the same wind wafted this mixture directly to a point where about 150 men of a construction crew were working on a new building for the alcohol plant.

Some of these men were using a rivet heater about 375 feet distant from where the break occurred. This probably ignited the gas. Ordinarily but three men are on duty at the alcohol plant, the process workers. Had the break in the line taken place only 10 or 15 minutes later, company officials say most of the construction gang would have been off the property and the heavy loss of life avoided.

What caused the break in the gas line is not known. The pipe was 4-inch, of heavy steel and had been in service only six weeks. Ordinarily pipe under similar usage is used for an average of six months at least. The gas was being put through the line, so the recording apparatus showed, at only 25 pounds pressure, from the low pressure absorption plant some distance away, and at atmospheric temperature.

The gas was similar to the waste refinery gas which is now recovered in many refineries at various parts of the plant, its gasoline content extracted and the gas burned for fuel in the plant. For the manufacture of alcohols a richer gas is desired than the average refinery gas after it has been stripped of its gasoline content, and this gas had a B.t.u. content of 1500. It was sour gas coming from West Texas crude being used in the distillation plant. The nature of the gas varies from time to time, depending upon what part of the refinery proper it is being drawn from.

The gas is piped underground from the low pressure absorption plant to the alcohol plant. It is brought to the surface in a 4-inch pipe directly underneath a cooling drum standing about 10 feet high and perhaps 8 feet in diameter. About 6 feet of the pipe is exposed. In this cooling drum the gas is cooled to about zero by means of a circulating brine mixture, since it has been found that better results in alcohol recovery are secured when the gas to be treated is reduced in temperature.



The break in the four-inch gas line at the bottom of the brine drum in the Standard of New Jersey's alcohol plant near Elizabeth, N. J., which let gas escape which became ignited and brought death to eleven workmen and injury to many more

Shortly after noon on the day of the accident, a plant workman heard the noise of escaping gas and discovered a small leak in the threaded joint where the gas line screws into a T at the bottom of the cooling drum. The workman said he was able to find the exact spot where the leak occurred by placing his finger over it. He immediately sent a helper for a Skinners clamp, such as are used around refineries to repair a break or leak in a line temporarily until that particular section of pipe can be replaced. Company officials said the Bayonne refinery has used an average of 23 of these clamps each month for the past six months for temporary repairs until pipe fitters can install new sections.

The clamp was placed around the pipe set up against a rubber gasket in the usual way and the leakage at once stopped. Instructions were sent through to replace that section of pipe the following day.

At five minutes to four, without further warning, the pipe broke completely off where the clamp had been applied, that is on the first thread on the tee. The exact reason for this sudden break is unknown. One company official is of the belief that, due to perhaps imperfections in this section of pipe, or the unusually corrosive action of the gas under conditions as found in this section, or a combination of both, the gas had eaten away the pipe at the point where threads in the pipe were exposed outside the joint, instead of in the joint itself.

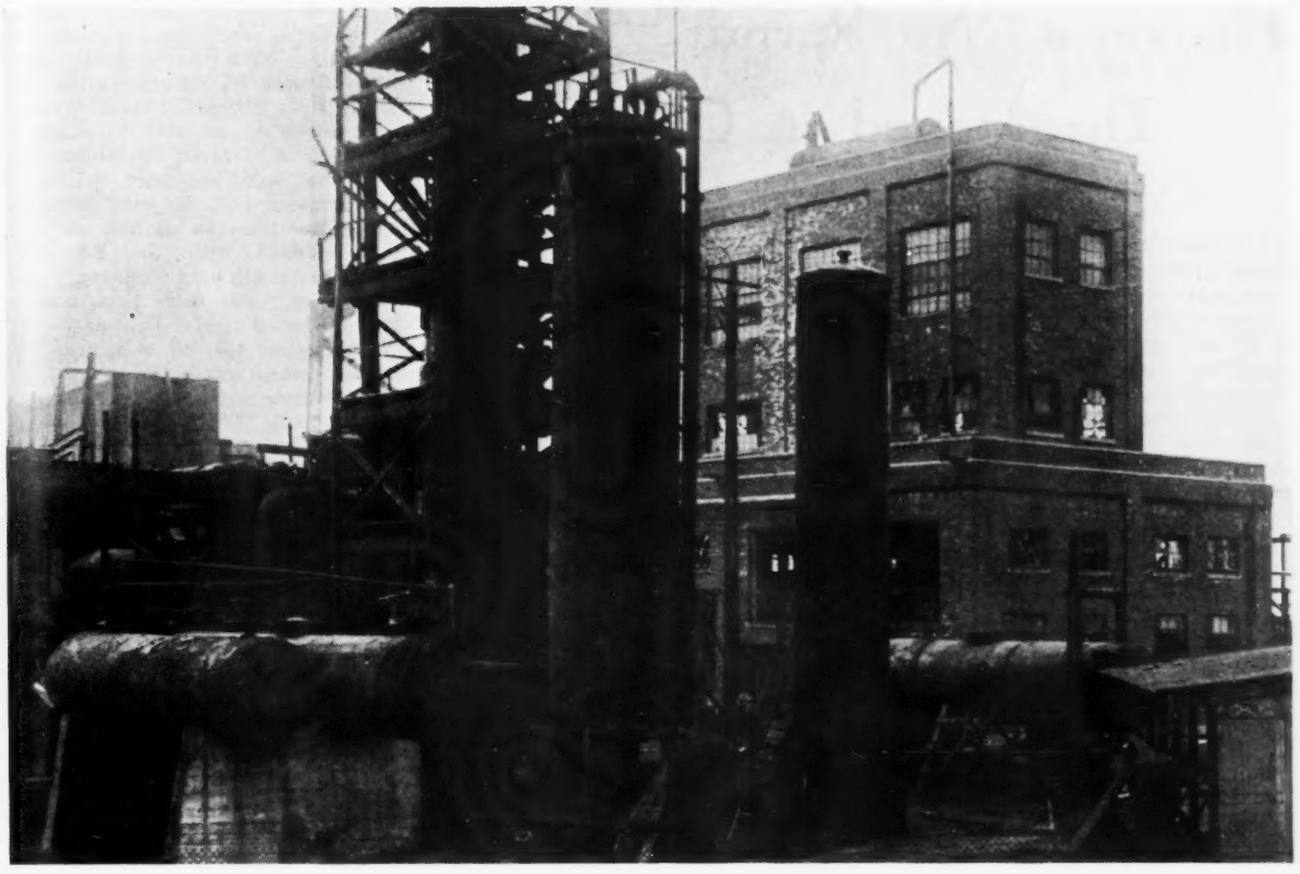
It was said that the action of the clamp as applied at the joint might be to aid a break of this nature rather than to check it. The particular section of pipe in question was at the spot of the hottest flames, so that it is feared but little can be learned now as to the condition of the metal before the ignition of the gas.

The breaking off of the pipe and the escape of the gas in large volume was discovered by one of the process men at the plant immediately, it is reported. This man had to run about 50 feet to a telephone to order the pumping station to shut down the flow of gas. It is estimated that not more than three minutes elapsed after the breaking the line before the first explosion took place at the point where the construction men were at work.

The gas could be seen, workmen said, traveling along the ground in a grayish cloud, but before the men at work could be warned the gas had reached them and become ignited. There were either one or two further explosions, of the gas which had gotten inside the building under construction.

Newspaper reports made it appear that the accident was in the operation of the alcohol plant itself. This was not true, the company pointed out, such a break as took place here might occur at several points in the refinery yard.

The alcohol plant here has been in operation about four years, with various changes, but without a serious accident of any kind. After the extraction of the olefin hydrocarbons



A view of the alcohol plant of the Standard Oil Co. of New Jersey, near Elizabeth, N. J. The break in the gas line, which led to the accident Feb. 18 in which 11 workmen lost their lives, occurred at a point in the middle foreground of the picture just to the right and back of the larger tower. Men examining the pipe can be seen in the picture. The larger tower is where the gas is treated with weak sulfuric acid after being cooled in the brine tower which was destroyed. The horizontal tanks at the left are the hydrolyzing tanks. The building in the rear housed the lead stills and towers

the residue gas goes back to the refinery to be burned as fuel.

In the operation of the alcohol plant, after the gas has been cooled in the brine tower, or drum, it then goes to a larger insulated tower, 35 or 40 feet high by about 15 feet in diameter. Here the gas travels through a weak sulfuric acid mixture, where the olefins are absorbed in an emulsion of oil and weak acid. From this tower the emulsion is delivered to hydrolizing tanks and thence to lead stills where the emulsion is rectified to produce pure alcohols.

W. P. R. A. Announces Meeting Program

TULSA, Feb. 19.—The program for the annual meeting of the Western Petroleum Refiners Association, and for the semi-annual meeting held under the auspices of the manufacturers' committee for technical men, was announced Feb. 19 by Howard Bennette. managing director. The meetings will be held at the Washington-Youree hotel, Shreveport, March 10, 11 and 12.

The association will meet at noon March 10, the session beginning with a luncheon. The president's annual address will follow, after which a general discussion of the points made in this speech will be conducted. Election of officers and directors will conclude that meeting.

The technical meeting will begin March 11 at 1:30 p. m. The program follows:

Opening Session—March 11

"Specifications of Natural Gasoline," S. S. Smith, Shell Petroleum Corp., Tulsa.

"Non-metallic Protective Linings for Petroleum Refining Equipment," Dr. J. C. Morrell, Universal Oil Products Co., Chicago.

"Fire Fighting Equipment in the Refinery—Its Maintenance and Use," E. E. Kerns, Louisiana Oil Refining Co., Shreveport.

Morning Session—March 12

"Instruments for Refining—Operation and Laboratory Testing," C. L. Huffman, Tagliabue Manufacturing Co.

"Handling and Shipping of Natural Gasoline," Emby Kaye, Skelly Oil Co., Tulsa.

Afternoon Session—March 12

"Depreciation of Refinery Equipment," L. D. Mann, Empire Refineries, Inc., Tulsa.

"Use of Waste Heat in Cracking Fuel Oils," B. P. Crittenden, Louisiana Oil Refining Co., Shreveport.

Mr. Bennette has urged executives and technical men planning to attend the meeting to make reservations as early as possible, due to the fact that several other events are scheduled for Shreveport on those dates and the hotels may be crowded.

Pa. Refining Co. Opens Offices at Butler

CLEVELAND, Feb. 25.—General offices of the Pennsylvania Refining Co. and the American Oil Works Co., which recently was merged with the Pennsylvania, have been established at Butler, Pa. An entire floor of the Butler Savings and Trust Bldg., has been taken by the merged companies.

Formerly all records have been kept and sales conducted from the refinery offices at Karns City and Titusville. In the future all sales will be conducted from the Butler offices and mail should be addressed there.

A. B. Weingard, vice president, will remain in Titusville for the present where he will direct refining activities and the Penn-Drake Distributing Co. the filling station division of the company.

Hoover's "No Permit" Policy Threatened in Court

WASHINGTON, Feb. 24

THE administration's policy of no permits to hunt for oil or gas on public lands may be overturned in the Supreme Court of the District of Columbia in a short time.

But for the request of H. O. Graves, assistant solicitor of the Department of the Interior, the policy would have been checked Feb. 18 to the extent that a writ of mandamus issued by a court of first instance can slow it up.

The request made by Solicitor Graves was that he be allowed to file a brief citing cases showing the court that it is within the competency of the secretary of the Department of the Interior to withdraw public lands from entry or development without specific authority of Congress or the President. But for that request Justice Bailey would have issued a writ commanding Secretary of the Interior Wilbur to give up his policy and return to the policy of issuing gas and oil prospecting permits under the national leasing law of Feb. 25, 1920.

"Without those cases," said Justice Bailey, "my present view is that the writs should issue."

This near overturning in the trial court took place when the question of the administration's policy was discussed in Justice Bailey's court in Barton vs. Wilbur and Vedder vs. Wilbur, two cases in which applicants for permits to explore the public lands asked for orders from the court directing Secretary Wilbur to proceed under the law to the consideration of their applicants with a view to the issuance of permits.

They asserted Secretary Wilbur, in carrying out the policy announced by President Hoover, March 12, 1929, cancelled existing applications for permits that had not gone beyond the mere filing stage and refused to receive any other permits, thereby violating the national leasing act. The fundamental contention of the administration is that the statute is permissive and not mandatory, which former view is the construction put upon it when rules and regulations were issued by the department for carrying the statute into effect, among which rules is one to the effect that the Secretary has the right to reject applications.

The fundamental contention of those who disagree is that the act is mandatory because Congress said that the lands should be subject to disposition and that the word "authorized" used by Congress was mandatory and that the Department of the Interior had so construed it in issuing the rules and regulations which were also "authorized."

Justice Bailey was distinctly hostile to the contentions on behalf of Secretary Wilbur not only on the point as to the authority of the Secretary to withdraw lands but upon others. He pointed out that President Hoover had not given any order but merely stated a policy.

"The mere statement of the President's policy is not an order or authority," observed the justice. Further he asked counsel if the policy did not thwart, rather than further, the purpose of the leasing act under which the applications for permits were filed.

While the cases were being argued another application for a writ of mandamus commanding Secretary Wilbur to receive applications was filed in the court by Thomas G. Kennedy, who said he filed applications in the Sacramento land office Aug. 19 and Nov. 12 last for exploration permits.

Not only did Kennedy ask for an order requiring Secretary Wilbur to issue permits but for an order requiring him to revoke General Order No. 338, which directed the dismissal of all applicants and closed the files to those who desired to file applications.

Richfield-Pacific Western Merger Rumored

LOS ANGELES, Feb. 22.—Richfield Oil Co. is reported to be trading comparative data with Pacific Western Oil Corp. with some sort of a merger in mind. Appraisals of their properties are being made.

Richfield, which has built up a considerable marketing organization, not only on the Pacific Coast but also in the east, is known to be short of potential crude oil reserves and is reported to be purchasing approximately 70,000 barrels daily to meet refinery runs. Part of this oil is purchased from Pacific Western under a contract running for eight years more. Although Richfield has some reserves in the upper San Joaquin Valley it is doubtful if the supply would equal the demand once the flush Los Angeles Basin fields have fallen off in production.

Pacific Western, under the direction of William C. McDuffie, formerly vice president and manager of production for Shell Oil Co. of California, has some valuable reserves but has no marketing organization. Controlling 1760 acres jointly with the Kettleman Hills Corp. in the Kettleman Hills district, Pacific Western is estimated to be able to share in a production of about 20 million barrels. One well has been drilled on this acreage but is now standing plugged at the top of the oil sand in compliance with the Kettleman Hills conservation agreement. The company also has some tidal acreage off the Elwood field. During the recent open-flow test of this area, the company's two wells yielded nearly 12,000 barrels per day, combined. All in all Pacific Western holds 32,545 acres in fee and 8272 acres under lease.

Advertising Pulls 11,000 Replies in Contest

LOS ANGELES—"If any advertiser doubts whether or not advertising in trade journals is read, he may be interested in knowing that the Merco Nordstrom Valve Co. received 11,275 slogans in answer to a series of three advertisements placed in approximately 14 trade journal publications, your publication being included," writes Jean King, of The McCarty Co., advertising agent of Los Angeles, to NATIONAL PETROLEUM NEWS. That company handles Merco Nordstrom advertising.

The slogans were submitted in a contest conducted by that company for a new, snappy slogan which would best describe its valves. The contest was on during last October, November and December, which 2200 individuals entered.

J. L. Pillow, of the Standard Oil Co. of Louisiana, Baton Rouge, La. won the first prize of $250 in cash with his slogan "Nordstrom—The Perfect Application of a Principle."

G. E. Genung, Detroit, won second prize with "Hydraulic Lubrication Insures Effective Manipulation." Seventeen other slogans were selected. A total of $500 in cash was awarded for prizes by the company.

LOS ANGELES, Feb. 22.—Arrangements have been completed for the 23rd annual banquet of the California Oil and Gas Association, to be held in the Sala d'Oro of the Biltmore Hotel, Los Angeles, March 6.

E. B. Reeser, president of the Barnsdall Oil Corp., president of the American Petroleum Institute, and H. R. MacMillan president of the California Oil and Gas Association, and vice president of the MacMillan Petroleum Corp. will be the principal speakers.

The arrangements for the banquet are in the hands of the Wildcat Committee of the Association, and an elaborate entertainment program is promised.

1929 Developments in Refining

By Dr. A. D. David*

(Presented Feb. 20 before Annual Meeting of American Institute of Mining and Metallurgical Engineers, New York)

THE object of this paper is to reduce to the simplest possible discussion the recent developments in refinery technology without resorting to detailed technical descriptions of the various items.

During 1929, the most noteworthy tendencies have been towards the installation of more flexible plants, more unified operations, more balanced performance, and greater fuel economy. In no other year in the history of petroleum refining has the industry witnessed to as great a degree the crystallization of so many developments in almost every phase of the art.

Economic pressure has been the controlling factor, supplemented, however, by a market demand for more volatile anti-knock gasoline and higher quality lubricating oils resulting from the extended use of high compression motors.

Possibly the outstanding achievement during the year has been the beginning of construction of plants by the Standard Oil Co. of New Jersey for the catalytic hydrogenation of the so-called heavier and inferior petroleum oils to produce therefrom not only high yields of anti-knock gasoline, but also lubricating oils equal in quality to the best grades obtainable.

It is reported that the plants will operate at a pressure of 4000 pounds or higher and temperatures in excess of 900 F. will be used. The hydrogen required for the conversion will be produced from refinery gases. This type of processing will doubtless be an important factor in balancing future operations; in other words, it can be used to eliminate present waste products and permit production of high grade products from low grade crude.

Another important development during the past year has been the extended use of vacuum stills, making possible the production of lubricating oils from what was formerly classed as "fuel oil crude," or crude from which only fuel residuum could be made. Better separation of the various fractions or lubricating oil distillates now makes it possible to produce pressable wax distillate free from non-viscous gas oil simultaneously with centrifugal cylinder stock and high melting point asphalt.

It has been reported that considerable progress has been made in continuous treatment of lubricating oils principally concerned with the separation of acid sludge by centrifuging.

In case of the filtration of the lubricating oils to acceptable colors, the contact filtering operation is being more extensively employed and the use of continuous earth burners, such as the Wedge and Herschoff types, has increased the efficiency and reduced the cost of clay recovery.

Much progress has been made toward the complete dewaxing of paraffin base oils. Methods have been developed by which the lubricating stocks from the distillation and treating units are dewaxed by the centrifuge or filter aid processes. Temperatures as low as minus 45 F. are used.

The Gover process of dewaxing by use of selective solvents has been further developed and now is said to be in successful commercial operation.

Another remarkable advance of the past few months has been the rapid commercialization of vapor phase cracking. This has been given attention primarily because of the increased demand for anti-knock gasoline. Operating cycles have been lengthened resulting in greater economy of operation which, together with a material reduction in amount of gas produced, makes this type of operation more practical.

Liquid phase cracking units are now being built which are capable of producing gas, gasoline and coke only, thus eliminating the production of fuel oil which, due to over production, demands a very low price. The coke formed is, in many cases, being pulverized and used for fuel in the same unit.

In cases where it is essential to produce fuel oil, much work has been done on the elimination of coke resulting from cracking, with the result that some outstanding units produce little, if any coke.

Attention is now being directed toward the reduction of gas losses from refinery operation. Absorp-

*Formerly general superintendent of refineries, Continental Oil Co., now associated with M. W. Kellogg Co., New York.

MORE flexible plants, unified operation, and greater fuel economy were the major tendencies during 1929 in the development of refinery technology. Catalytic hydrogenation of heavy petroleum residues to produce anti-knock gasoline and first class lubricating oil fractions was further advanced by the construction of plants by the Standard Oil Co. of New Jersey for the exploitation of Bergius process.

The use of vacum distillation equipment for the manufacture of better grades of lubricating oils has been extended very widely, permitting the production of acceptable lubricants from crudes hitherto considered unsuitable for the manufacture of lubricating oils. More complete dewaxing of lubricating fractions by centrifuge, solvents, and filter aid has progressed materially.

Vapor phase cracking continues to advance, liquid phase processes are being improved so as to eliminate the production of fuel oil, or reduce the coke formation, as may be desired. Vapor phase treating of distillates to retain anti-knock properties has become more important.

A tendency toward the use of distillation systems combining topping, cracking, and lubricant distillation is noticeable; the replacement of shell stills by tube stills is almost universal. Radiant type furnaces, such as the De Florez, in which the convection section has been replaced by an air preheater, are being installed and the tendency is toward the elimination of convection heating. Indirect heating methods, using such materials as mercury and diphenyl, have been developed and are used in plant operations.

Improvements in auxiliary equipment, pumps, automatic control instruments now permit the operation of units handling 15,000 barrels of crude per day.

tion and gasoline plants have been erected in conjunction with topping and pressure units to recover the gasoline contained in the residual gases, in addition to eliminating the dissolved gases in the gasoline produced. By means of such installations, storage losses and losses due to handling in tank cars and station tankage have been reduced.

Some of these units have been installed in conjunction with cracking equipment, utilizing waste heat from cracking operations to reboil the gasoline from the base of the stabilizer tower. The recovery of gasoline from pressure still gases averages from three to five gallons per 1000 cubic feet of vapor, which in many cases represents as much as 2 per cent of the original crude.

Vapor phase treatment of cracked distillates has been increased in an attempt to reduce acid treating, thereby preserving anti-knock value. Bubble towers have been added to this type of equipment for the purpose of fractionating out all of the polymers, thus producing a more stable gasoline.

A definite trend is noticeable toward the use of crude topping and light distillate rerunning equipment in combination with apparatus for cracking and lubricating oil distillation. The prevailing prejudice against the combination of these so-called independent operations is giving away, due to the fact that there are now in operation installations of this character which are functioning most efficiently.

The use of shell stills is passing. Replacements are almost invariably of the tube still type. There have been many recent improvements in tube stills along the lines of increased fuel efficiency and decreased installation costs. These have been brought about largely by the increase of radiant heat transfer surface, improvement in the convection bank design, improvement in burner design and the addition of air preheaters for recovering heat from the flue gases.

One outstanding example of this is the DeFlorez furnace in which the total heating surface in the furnace is of the radiant type and the convection bank is replaced by a conventional type of air preheater. The design of this furnace is unique in that it consists of a cylindrical fire box lined with radiant vertical tubes with the air preheater and stack located on the top of the unit.

The burner is at the bottom of the shell, and the unit is fired up thru the center. It has been successfully used in conjunction with vapor and liquid phase cracking, topping and vacuum distillations. In general it is quite usual to obtain an overall fuel efficiency of from 70 per cent to 75 per cent with these modern tube still installations, as compared with the old shell still operation showing a fuel efficiency of from 30 per cent to 40 per cent.

The use of indirect heating methods employing such heating mediums as mercury and diphenyl have been closely studied and a few commercial installations have been made. These processes both operate under vacuum and the advantage claimed for them is that by the use of indirect heating, more accurate and uniform control of temperature conditions can be obtained.

There have been many developments in the improvements of auxiliary apparatus such as pumps, and control equipment. The advance in design of hot oil centrifugal pumps has permitted handling large quantities of hot oil at high pressures and increased efficiencies. The use of high speed efficient turbines has materially reduced the cost of operating these centrifugal pumps. The adaptation of efficient reciprocating steam engines to driving high speed reciprocating pumps has also been a very important factor in reducing the cost of pumping hot oil.

The field of automatic control has received a most intensive study, with the result that automatic controllers are now available for controlling pressure, vacuum, temperature, rate of flow, levels and combustion. This has resulted in very important savings in labor and fuel costs and because of the uniformity of operation resulting from their use, maximum yields of specification products are permitted.

As a result of these improvements in methods of handling and control, single units are now being built for handling as much as 15,000 barrels per day, this increased volume per unit, of course, materially reduces the unit operating cost thereby increasing the margin of profit.

A. I. M. E. Oil Division To Have Secretary

NEW YORK, Feb. 22.—The American Institute of Mining & Metallurgical Engineers decided during the year to give the petroleum division a paid secretary, it was announced by Dr. H. Foster Bain, A. I. M. E. general secretary, at the dinner which closed the petroleum division annual meeting.

Arrangements have been made with the University of Oklahoma whereby Dr. H. C. George, professor of petroleum engineering there, will be permitted to give part of his time to the petroleum division. This will be effective at once.

Dr. J. B. Umpleby, retiring chairman of the division, gave figures at the dinner to show the increase in the division's personnel. There were 1040 members in 1928 who signified to the headquarters that their principal interest was petroleum. In 1929 there were 1110 and as of the first of 1930 there were 1250.

C. V. Millikan, of the Amerada Petroleum Corp., Tulsa, is the new chairman of the division. L. L. Brundred, consulting engineer, Los Angeles, was elected associate chairman; Dr. H. C. George, secretary-treasurer.

W. K. Whiteford, division superintendent, Barnsdall Oil Co., Tulsa, is the new vice chairman for production engineering. Associates are W. W. Scott, Humble Oil & Refining Co., Houston; Earl Oliver, Ponca City; and V. H. Wilhelm, Los Angeles.

J. Elmer Thomas, Fort Worth, was elected vice chairman for economics; D. R. Snow, Barnsdall Oil Co., Tulsa, vice-chairman for production; H. H. Hill, Standard Oil Co. of New Jersey, vice-chairman for engineering research and Dr. E. R. Lilley, New York, vice-chairman for engineering education. The new executive committee consists of Dr. J. B. Umpleby, J. R. Suman, Humble Oil & Refining Co., Houston; C. E. Beecher, Empire Companies, Bartlesville, Okla. and J. A. Holmes, 2nd, Pan-American Petroleum & Transport Co., New York.

To Build Cracking Plant At Vinvale

LOS ANGELES, Feb. 14.—H. W. Parmelee, secretary and treasurer of the recently formed Rotary Process Refining Co. Ltd., has announced that construction of a 1000 barrel capacity plant at Vinale, Cal., is to be started March 1 and that it is expected the first runs to the stills will be made soon after May. 1.

Mr. Parmelee has just returned from the east where he supervised the construction of the cracking units being built by the Bethlehem Steel Co., Bethlehem, Penn.

Contracts have been made for residuum from Rio Grande Oil Co.'s straight run plant at Vinale.

J. E. Elliott, president of the Elliott Core Drilling Co., is also president of the new company and F. C. Merritt is vice president and general manager.

Engineering Firms Merge

CLEVELAND—The P. H. & F. M. Roots Co., Connersville, Ind., manufacturers of blowers, pumps and meters, has been taken over by the Stacey Engineering Co., Columbus, O. Other firms involved in the merger are the Connersville Blower Co., Connersville, Ind., the Wilbraham-Green Blower Co., Pottstown, Pa., and Stacey Bros. Gas Construction Co., Cincinnati.

Col. Carmi A. Thompson, Cleveland, will be president; Corwin Abbott, vice president and general manager; Fletcher S. Heath, vice-president; Erle G. Meeks, secretary and treasurer; and Charles T. Gordon, general superintendent.

Independent Operators in Texas Seek State Pipeline Law

By Paul Wagner
N. P. N. STAFF WRITER

FORT WORTH, Feb. 22

INDEPENDENT Oil Men of Texas, after effecting a permanent organization at Fort Worth, Feb. 22, asked Governor Dan M. Moody to submit for passage at the present special session of the legislature a pipeline bill. This bill would provide for ratable takings of crude from the various fields of the state, lower pipeline tariffs and the inauguration of the credit balance system of handling runs.

A committee was appointed to bring the subject further to the attention of the governor. The committee is composed of C. L. Morgan, Ernest May, J. D. Parnell, E. G. Bedford, Cal Estill, L. L. Farr, Roy B. Jones, George Calvert and Ed Mayer. Members of the newly perfected association will move on the capitol city of Austin en masse, Feb. 27, to support its committee in asking the governor for relief measures for independent operators.

The governor was to be told, it was the unanimous vote of the Fort Worth gathering, that pipeline legislation is so urgent that an emergency bill is necessary.

Although not mentioned in the meeting, it was common talk that the proposed bill would call for pipeline rate making in the same manner as rail rates are fixed, with a two-thirds reduction sought from present rates.

The proposed bill would be similar to the West Virginia law, which provides for ratable takings of crude and the provision of sufficient storage facilities by transporting agencies to permit application of the credit balance system, which also would be invoked.

In discussing the proposed law, Tom Cranfill of Dallas, elected permanent president of the Independent Oil Men of Texas, said the present producing situation in Texas as constituting a buyers' market for crude. The same situation prevailed, he said, in Oklahoma.

Joe Danciger of the Danciger Oil & Refining Co., an active operator in the organization, referred to 1929 production in Texas as totaling approximately 298,000,000 barrels, of which he said figures showed 169,000,000 barrels produced by major companies and 129,000,000 barrels by Independents.

"A reduction of only 10 cents a barrel in pipeline charges," he said, "would mean a saving of nearly $13,000,000 to Independents."

Mr. Danciger's figures were based on the assumption that such a reduction in pipeline rates would accrue to the producer as a benefit from crude oil prices.

Roy B. Jones, president of the Panhandle Refining Co., Wichita Falls, who was elected one of the association's vice presidents, asked the members to get behind a measure being sought through the governor's submission of a bill allowing permissive legislation affecting cooperative development.

Permissive development legislation is being sponsored by a group of larger Independents composing a steering committee of the Texas division, Mid-Continent Oil & Gas Association, which visited the governor two weeks ago. The bill proposed by that committee was referred to the attorney general's department for a ruling as to whether it would nullify the Texas anti-trust law.

In case the attorney general finds there would be no nullification of the trust statute the Texas division committee has hopes that Governor Moody will include it in proposed legislation at the special session.

The Independent Oil Men's organization took no action on the bill, referring it to its executive committee for further consideration and possible action before the hegira to Austin.

IN DISCUSSING the gravity of the present crude situation, Mr. Jones told the Fort Worth meeting that he is for an oil tariff 100 per cent and that he believes a pipeline law would help. He has been doing a lot of work on oil industry cooperation, he said, for the last two years.

"I believe a tariff would help," he said, "but I do not believe it would cure all of our troubles. The pipeline law also should be a help. But there is another thing we need. Our state anti-trust law is tighter than the national law."

Mr. Jones referred to "one of our main companies that won't agree to any conservation program because it is afraid of the law." Continuing, he said it wouldn't be for the movement anyhow, "but the present situation gives it a smoke screen to hide behind." Although he did not specifically name the company it was plain he meant the Gulf Oil Corp., and its subsidiaries, as he described it as an interest which operates its own pipelines solely to handle its own production to its own refineries in Texas.

BESIDES Messrs. Cranfill and Jones, officers of the Independent Oil Men of Texas include Lou D. Ladd, Fort Worth individual operator, and Roy Westbrook, president of the Westbrook-Thompson Holding Corp., as presidents. C. L. Morgan was elected to the combined post of vice president, secretary and treasurer.

Directors of the association include:

Amarillo District: Ed Mayer, Earl Calloway and John G. Sherrin.

Midland District: E. G. Bedford, Robert T. Piner and Will P. Edwards.

San Angelo District: N. W. Tanner, Preston G. Northrup and George Henshaw.

Wichita Falls District: Walter K. Campbell, R. L. More and Clifford Moors.

Fort Worth District: Harry Reynolds, John M. Gholson, and Lem Shields.

Abilene district: Eugene Moutray, Tom Grisham and Tom Bryant.

San Antonio District: George E. Smith, C. L. Witherspoon and C. O. Maddox.

Laredo District: O. W. Killam, Geo. Marshall and Usher Carson.

Houston District: Dan J. Harrison and two others to be appointed.

Corpus Christi District: Charles Carter, James Kepley and W. F. Morgan.

Dallas District: Clint W. Murchison, Tom Cranfill and E. B. Germany.

Corsicana District: E. L. Smith, W. C. Stroube and R. L. Wheelock.

Seguin district: L. C. Turman, Lem Allen and C. F. Richards.

Directors from the state at large will include the following Fort Worth group: Stanley Thompson, S. B. Edwards, John W. Naylor, A. J. Broderick, Mel Ingleright, C. E. Hyde, Jack Danciger, C. F. Kelsay, and L. D. Ladd.

Influence of West Texas Fields To Increase This Year

By Telegraph
HOUSTON, Feb. 23

GROWING field development in Ector County and the announcement that the Cosden Oil Co., Inc. will double its Big Springs refinery to 20,000 barrels crude capacity daily foreshadow increasing influence of West Texas on the general oil situation this summer.

President J. S. Cosden of the Cosden Co., has already arranged to make common carrier shipments of 5000 barrels of crude daily from the Judkins area of Ector county to Big Springs through the Magnolia Petroleum Co.'s system running east from West Texas. Magnolia expects to finish within 30 days a 9½-mile gathering spur to take care of oil from the Cosden owned wells.

Mr. Cosden already has two Judkins district wells capable of producing more than 5000 barrels daily and is drilling others in the university land area where competitive development is being forced by leasehold requirement. Five producing wells in the field are potentially good for upwards of 8000 barrels daily at present.

A total of 19 locations and drilling wells are under way in the Judkins district, which operators believe will prove the equal in producing value of earlier Crane and Reagan county development areas. In the proved area drilling is confined to operations of the Cosden Oil Co., and the Ladreth Production Co., on university lands and the partnership composed of the Humble Oil & Refining Co., Robert R. Penn and the Atlantic Oil Producing Co., on a six section block where Penn drilled the field discovery.

No move has been made as yet to bring about prorating in the Judkins area such as has been practiced in the Winkler and Pecos county areas of West Texas. Leasehold requirements are such that most of the holes drilling had to be put down, either because of university land stipulations or because such tests forced protective offsets. Whatever conservation move may be sought in the future will have to take the form of attempted prorating practice as drilling operations cannot be curtailed for the present.

Potential production of the cooperatively drilled Van area in Van Zandt county, east Texas, is now estimated in some quarters to exceed 50,000 barrels from the ten producing wells completed. The wells were being exploited at the end of the week at 8705 barrels daily.

The ninth and tenth Van wells were current week completions on acreage originally leased by the Sun Oil Co., and The Texas Co., prior to pooling for cooperative development. The Sun's No. 1 Thompson came in for 10,000 barrels estimated open flow production at 2630 feet three-quarters of a mile northeast of the Pure Oil Co.'s Jarman discovery. The Texas Co.'s No. 1 White was also estimated good for several thousand barrels daily at similar depth.

In the Darst Creek field of the Luling fault zone of central south Texas 11 new completions were made in the last week. They brought the field's estimated potential above the 100,000 barrel mark daily as compared with official potentials of the prorating committee approximately 60,000 barrels daily, Feb. 15.

Market outlet on which the Darst Creek field production is based keeps the district within approximately 15,000 barrels production daily.

The outstanding Darst Creek completion of the week was the Gulf Production Co.'s No. 1 Knoblock drilled to a total depth of 2538 feet and flowing at the initial rate of 10,120 barrels daily. Gulf's No. 1 Thomas Dix was completed earlier in the week for 7200 barrels initial production.

Yates field operators of Pecos county have reversed their earlier decision to ask the railroad commission of Texas to approve a reduction in exploitation from 130,000 barrels daily to 100,000 barrels. It is necessary under Texas law to show the necessity of protection from waste before the railroad commission can act on recommendations of advisory committees on prorating.

It was decided that in view of pressures maintained in the Yates field, the absence of water encroachment except at levels low on the flank of the structure and because of the low exploitation as compared with the several million barrels estimated open flow daily potential in the field that no such showing could be made consistently.

The railroad commission therefore was asked to extend prorating practice another six months on the present basis and approval was speedily given.

Ray Richmond as umpire in the Yates field shows that the gas oil ratio in the district is only 337 cubic feet to the barrel according to a test on 97 wells connected with the Humble Oil & Refining Co.'s natural gasoline plant there. The Shell Petroleum Corp. has reduced the volume of gas per barrel of oil in several wells to about one-tenth of the amount previously shown by running tapered tubing. The Gulf, Humble and California companies are now adopting this practice.

Mr. Richmond found probable that the Yates field will go down in history as the most economically exploited of all districts produced until now. Estimates of ultimate production from Yates were placed at 700,000,000 barrels and rock pressures are virtually the same as they were a year and a half ago.

The Texas Co.'s announcement that it would pay 50 per cent of its north Texas runs from wells of outside connections and store the remaining 50 per cent at 3 cents per barrel per month applies to the Wichita Falls and Panhandle districts in particular. Two areas of small development in Cooke and Jack counties are excepted. The new policy especially affects Wilbarger county production, which came under a similar prorating policy laid down by the Humble and Sinclair companies at the beginning of the year. The Texas Co. announcement was followed at the end of the week by similar action by the Waggoner Refining Co.

Amarillo P. & R. Corp. Reopens Pyote Plant

CLEVELAND, Feb. 24.—The Amarillo Producers and Refiners Corp. will reopen the old Pyote refinery of the Del Rio Refining Co. on March 10, according to P. H. Hertzog, vice-president of the Amarillo Corp. and general sales and traffic manager for both companies. This plant was closed last July on account of the termination of crude supply when the Texon Oil and Land Co. was taken over by the Marland-Continental interests.

Through a contract with the American Petroleum Co. of Houston, the Pyote plant will be supplied with crude from the latter company's storage at Pyote, at the rate of 1500 to 2000 barrels per day.

The Amarillo office of the company has been closed, and a general office for both companies will be maintained at Del Rio, where the Del Rio Co. has a 3000-barrel plant in operation. J. D. Wrather is president of both companies, will retain active management, and will open his office soon at San Antonio.

Sales and traffic matters will be handled by Mr. Hertzog, as heretofore. John Wrather, son of the president, is in charge of operation at both the Del Rio and Pyote plants. Products of the two plants will be marketed throughout Texas and the Mid-Continent territory.

Talks Before University Class

AKRON, O., Feb. 20.—An address on the value of Stod-Sol to patrons of dry cleaners was given on Jan. 6 before a class at the University of Akron by Leroy F. Young, in charge of the warehouse at the Akron bulk plant of the Anderson-Prichard Oil Corp., Oklahoma City, Okla.

Huge Savings By Unit Development Reported at A.I.M.E. Meet

By Lawrence E. Smith
N. P. N. STAFF WRITER

NEW YORK, Feb. 22

MARSHALLING an array of fact and opinion, the unit development committee of the petroleum division, American Institute of Mining & Metallurgical Engineers, contributed in a large way to the subject on Feb. 18, when a symposium was held as the opening program of the division's annual meeting.

The committee was appointed last October, in the mid-year meeting held in Tulsa. At that time Dr. J. B. Umpleby, chairman of the division, named Earl Oliver, of Ponca City, as chairman of the unitization committee and the following as regional chairmen to direct the preparation of reports on specific areas: Joseph Jensen, California; Fred E. Wood, Rocky Mountain area; A. W. Ambrose and C. E. Beecher, Kansas and Oklahoma; Dr. F. H. Lahee, Texas, Louisiana, Arkansas and New Mexico; Harry H. Hill and E. I. Estabrook, Appalachian region and foreign fields. Each appointed his sub-committee assistants.

The question of unit operation, once controversial, is now accepted as general policy of the oil industry. It was endorsed by resolution by the American Petroleum Institute directors last December and President E. B. Reeser has in recent days appointed a large central committee to promote such policy.

The Mid-Continent Oil & Gas Association has a committee at work, has formally endorsed unit operation and is now preparing a handbook which will contain practical operating details. The A.I.M.E., for a long time an open forum for technical discussion, is pursuing its studies with the aim of supplying engineering data which will aid in the fullest realization of benefits from unit development and operation of individual pools.

A participant in the discussion was Henry L. Doherty, long time champion of unit development. With Mrs. Doherty he remained throughout the afternoon's session. The founder and head of the Cities Service organization appears to be in good health again, having recovered from an illness which kept him from active participation in business for more than two years.

Mr. Doherty took occasion to reiterate the arguments which by now are familiar to the oil industry. He long has contended that the federal government should assert jurisdiction over development of oil fields, acting under the broad powers of national defense given to the federal government by the constitution. He warned that he intends to become active in this respect very soon.

"I made up my mind some time ago that I am going to make a fight," he said. "If anyone gets in the way, that will be unfortunate."

Later, when Chairman Oliver asked for suggestions as to the scope of work that should be done in the future, Mr. Doherty urged the engineers to go ahead with their studies. There is a feeling among oil company executives, he said that they should direct the scientific thought of their employes. He said there should be no barriers raised to free expression and said the A.I.M.E. was a proper forum for technical inquiry.

In opening the meeting, E. L. Estabrook, consulting petroleum engineer, Pan-American Petroleum & Transport Co., proposed questions which he said the A.I.M.E. committee should attempt to answer.

"The profits to be derived from unitization are expected to come from three sources," he said. "First, decreased expense of development and operation; second, increased recovery and more complete utilization; third, better prices for the product through elimination of distress selling in times of overproduction. The work of the A.I.M.E. committee is particularly the collection and presentation of the facts concerning the first and second expected sources of profit. . . .

"The unitization of oil pools is a big project involving many divisions of the petroleum industry. The rights of the landowners, the royalty holders and the lessees are affected; state or national legislation may be required; operating agreements must be devised which will take care of the changing prospectivity of adjoining acreage as the geological structure is made known by drilling; boards of appraisers and of operating engineers and geologists must be organized, and a multitude of other details require study and definition. . . .

"There are disadvantages to unit operation as well as advantages. Men need the stimulation of competition if they are to do their best. Unitization may mean stagnation instead of progress. Short sighted management may fail to take advantage of the opportunities for sound economy which are created by unitization.

"Theoretically, unit operation makes possible an increase in the ultimate recovery of oil by repressuring during the early life of the field but there are few, if any, places where the method is being used. The fact is that crude oil is, and has been for years, so cheap and so abundant that it has not generally been considered prudent business practice to invest large sums in compressor stations and other equipment for a prospective increase in production at some considerably distant date.

Improved production practices which have accomplished some conservation without much additional expense have been welcomed but the industry generally has not made up its mind to spend real money on improved extraction methods.

"We must use care in estimating the advantages of unitization lest we count a number of conservation chickens before they are hatched."

California Practice

THERE is no outstanding example in California today of an important producing unit where the competitive drilling-drainage feature is or was entirely eliminated, said Joseph Jensen, chief petroleum engineer, Associated Oil Co. in his paper. However, the practice in that state for many years has been leaning in the direction of unit operation.

"No man," said Mr. Jensen, "or company in California ever drilled a wildcat well without exerting every possible effort to get all of the structure, so as to control drilling and avoid competition. . . . In this state the practice of selling acreage around a wildcat well has not been followed, except possibly in very rare instances.

"The operator drilling the wildcat knew he must pay the bill alone, so

he endeavored to get the benefit of his effort by tying up all of the land around his well and by so planning his different lease obligations to get all of the land; it was because someone's price was too high, some other oil man also had the same idea and already held some lands, a competitor took leases away from him while his work was still incomplete, or (as was so often the case) the hidden structure when developed did not prove to be where the wildcatter thought it would be. This latter condition often resulted in the last leases secured forcing the drilling campaign and setting up serious drilling drainage problems."

In his paper, which was read by L. L. Brundred, consulting petroleum engineer, Mr. Jensen described the early day land situation in California. Full title to lands in some of the fields, notably Kern River, was secured by the oil companies; with no royalty owners to consult it has been possible to shut in production in certain of the older, heavy oil fields. The other extreme is the town lot condition found in some fields of the Los Angeles Basin.

Although unit operation in its true sense is not conspicuous in California, Mr. Jensen pointed to several instances of an approach to that condition. Well spacing agreements, as in the Dominguez and North Belridge fields; limiting the penetration of the oil zone, in Dominguez and Inglewood; development of underlying zones after the near depletion of upper ones, using three stages of development, practiced by companies in the main Seal Beach field, thus avoiding at some locations two sets of wells, were some of the cooperative measures described.

Controlled drilling in the Ventura Avenue field has been practiced and the shutting in of high gas/oil ratio wells is another example of cooperative work. Eighty such wells are now shut in, Mr. Jensen said.

"This field has demonstrated that unit operation, or some sort of control, is necesary to protect the deposit from waste. No matter where the first wells have been drilled on the structure, they eventually become most wasteful gas wells as they grow older. The gas/oil ratio in wells increases 10 and 20 fold with age, i.e., from 1000 to 10,000 to 20,000 cubic feet of gas per barrel of oil. Such excess gas comes out of solution and leaves unrecovered oil in the ground.

"The remedy is to shut in the old wells when their gas/oil ratio increases above the general average of new wells. A common ownership would permit this being done. Near-unit operation does not. By some it is thought that the new gas law contains in it the remedy of such a situation. Thus far the remedy has not been applied."

The nearest approach to unit operation in prospective fields of the state is at Carpenteria, in Santa Barbara county. Nine companies, headed by the Continental Oil Co., have arranged a controlled prospecting and development program for nine state prospecting permits along the ocean shore. Property rights have not been transferred, but a fund is set up out of production to be divided among the participants.

Two papers dealing with unit development in Oklahoma and Kansas were presented in this symposium. One was the joint effort of A. W. Ambrose, and C. E. Beecher, of the Empire Companies, Bartlesville and the other was by Sam Harlan, of the same organization. The joint paper was based upon replies to a questionnaire sent to engineers and others in the area covered. Mr. Harlan's paper dealt with one pool.

Messrs. Ambrose and Beecher summarized findings, as follows:

1—Unitization is growing rapidly, as evidenced by the number of units and the large total acreage now included in units, as compared with practically no acreage two years ago.

2—Operators are convinced that unitization is reducing development and operating cost and they anticipate greater reductions as experience is gained in unit operation.

3—Producing units have not been in operation for a sufficient length of time to give any production history from which to estimate the ultimate recovery of oil, however, the general opinion seems to be that more oil will be recovered.

4—In view of the benefits to be derived from unitization, many operators are refusing to carry on wildcat operations unless a unit has been formed. If this attitude continues to grow there will be no large pools developed in Oklahoma and Kansas in the future except under unit control.

Specifically, the authors found that a large amount of acreage in the two states has been brought under some form of unit control. While not all units were reported, the result of their count is notable:

	Oklahoma	Kansas
Number units reported	*27	**30
Total acreage	49,350	171,420
Smallest unit	320 acres	400 acres
Largest unit	10,080 acres	28,000 acres
Average acreage per unit	1,828 acres	5,714 acres
Average number of companies per unit	4.7	3.3
Companies per unit	3-10	2-9
Form of Agreement	***Committee	Committee
Producing units	9	3
Non-producing units, not tested	13	19
Non-producing units on which dry holes have been drilled	6	9

*Does not include three units reported without giving acreage.

**Does not include one unit reported without giving acreage.

***One contract to test acreage.

Maps showing several unitized pools were presented by the authors. These are published herewith. The description and explanation given by the authors is as follows:

Progress in Mid-Continent

Sketch maps have been prepared to show a few unitized areas on which production has been obtained and to briefly outline a few points regarding each unit.

Fig. 1 shows a portion of a pool in Kansas which was combined into a unit. There were only 3 operators included in this unit and it is understood that one of them had no acreage at the time of forming the unit but was given an interest in the block for drilling the initial well. One company owned the major portion of the acreage in the unit which it acquired as the result of core drill information. The outline of leases is shown on the map. It is evident that unitization has prevented a widespread drilling campaign that usually follows a discovery of this character and the many dry holes resulting from such a drilling program. A large flush production also was prevented.

Fig. 2 is the outline of a unitized pool in Oklahoma showing the individual leases and those included in the unit. This pool was located as the result of core drill tests and a unit formed based on the possible limits of the pool. The productive area, however, was found to be limited to only a few wells, most of which are located on the leases owned by one of the three companies in the unit.

At first, this might appear to be a hardship on the company owning the leases because 15/33 of the production must be credited to the other two members of the unit, but this company does not consider it such for it is interested in other unitization projects and believes that in a series of such unit operations these conditions will be equalized. The savings resulting from the elimination of competitive drilling may have decreased development costs to such an extent that the company has actually made a profit on this unit.

Fig. 3 is the outline of a unit pool in Oklahoma in which the total gross production to Jan. 31, 1930, has been over 1,000,000 barrels. The unit consists of 640 acres divided into 12 different leases originally owned by eight different operators. It is estimated that at least eight additional dry or non-commercial wells would have been drilled in this area had it not been unitized.

In this connection it is interesting

to note the dry holes drilled around the center of Sec. 10 to the west of the unitized block. These wells were drilled two or three years ago. Had the area been unitized it is safe to estimate that over half the cost of the dry holes could have been saved.

If the leases were being developed individually there would be several gas lift plants. Under present conditions one gas lift plant is expected to handle the operations and the extraction of gasoline is taken care of for the entire unit. Cost of development has been reduced by operating only a few drilling outfits at once. This has also reduced the cost of water and gas and the necessary piping.

Low operating costs are anticipated because only a small personnel and overhead will be required. Because of unitization, repressuring operations may be profitable in the area at some future date, while under divided ownership this would not be considered.

Nonunitized Development

A few sketches have been prepared for the purpose of showing a contrast in development between unitized and non-unitized areas.

Fig. 4 shows development of a nonunitized pool in Kansas. The outstanding feature of this development is the large number of drilling wells and the few producing wells. At the present time there are six producing wells, 50 drilling wells, 15 different operators, and development started on 23 different leases. The discovery well has been abandoned because of mechanical troubles and a twin well is now being drilled. If this pool had been unitized, there would be only one operating instead of 15 and possibly five or six strings of drilling tools instead of 50. Under the present development program many dry or unprofitable wells will be drilled, a large per cent of which could be eliminated if unit operation was in effect.

No effort has been made to estimate the savings in development and operating cost of this pool under a unitization plan as compared with the present plan, however, it is safe to estimate that these savings would be several million dollars.

Fig. 5 shows two maps of the same pool, one as actually developed and the other as development would have been under unitization. The date of completion is shown for the discovery well and the date of starting for the other wells. The expiration date is shown for each lease.

In the area under consideration there are 800 acres, divided into 13 leases owned by 11 different operators. A total of 21 oil wells and four dry holes have been drilled and one well is now drilling.

If the pool had been unitized it is estimated that only nine wells would have been drilled to date, eight of these oil wells and one dry hole. The locations of the wells are shown on the map. The discovery well would have been drilled on the first lease to expire and after its completion as a commercial producer three offset wells would be required.

The leases in the northeast and southeast corners of the unit would require development next because of expiring leases. A producing well would have resulted from drilling in the southwest corner of the northeast lease. The three offset producing wells would then be drilled. The well in the northwest corner of the southeast lease would have been a dry hole. With this information available three dry hole offsets would not have been drilled.

The present development as a whole has not been profitable. It is estimated that eight leases on which wells have been drilled will not pay out, one lease is questionable, but may produce enough oil to pay out, two leases will pay out and probably make a small profit on the investment, and one small lease has already paid out.

Some figures have been prepared to show the estimated status of the pool as of Jan. 28, 1930, as developed and what it might have been under unitization. The figures indicate that unitization would have greatly reduced the investment and the present net production while being smaller, would have cost much less per barrel.

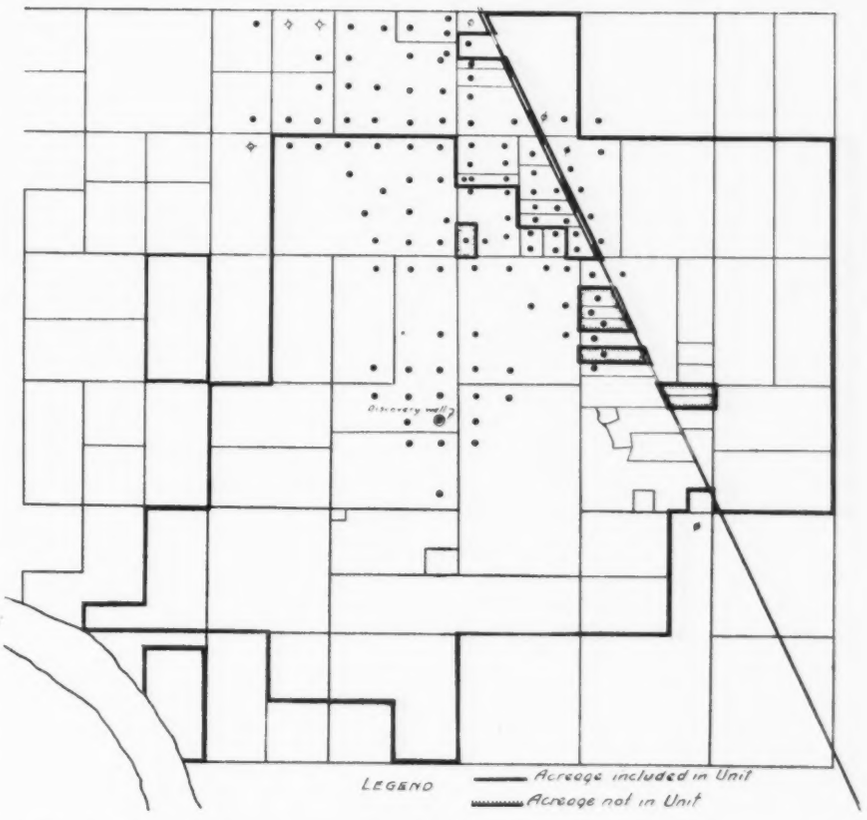


Fig. 1—Portion of a Kansas pool which was unitized by three operators

As Developed

26 wells @ $60,000	$1,560,000.00	
Miscl. Inv. @ $7,500 for each prod. well	157,500.00	
Total Investment		$1,717,500.00
Production: 762,134 Gross Barrels 66,867 Net Bbls. @ $1.60	1,066,987.00	
Oper. Exp. @ 20c per bbl.	133,373.00	
Net Earnings		933,614.00
Balance to Pay Out		783,886.00
Present Production: Gross—2,810 Bbls.; Net—2,460 Bbls. Present cost per net bbl. based on retired portion of investment		319.00

Estimated Unitized Development

9 wells @ $60,000	540,000.00	
Miscl. Inv. @ $7,500 per well	67,500.00	
Total Investment		607,500.00
Production: 449,775 gross bbls. 393,553 net bbls. @ $1.60	629,685.00	
Oper. Exp. @ 20c per bbl.	78,710.00	
Net earnings		550,975.00
Balance to Pay Out		56,525.00
Present Production: Gross—727 bbls.; Net—636 bbls. Present cost per net bbl. based on unretired portion of investment		$ 89.00

Mr. Harlan's description of the Haverhill pool unit, Butler county, Kans., pertained to a single ownership project, the Empire having 100 per cent of the productive acreage. He told of the economies of operation possible because of the absence of competitive drilling methods.

"For comparative purposes, the Haverhill development expense has been checked against two Osage properties on which a total of 32 wells were drilled with as many strings of

tools and in record time," he said. "These two properties approach the extremes in drilling policies for proved productive acreage under single management. The Osage wells had the same general characteristics as those at Haverhill.

"The total development cost per average hole drilled on the former was $52,200, while the corresponding expense for Haverhill was $30,222. The expense of complete strings of big pipe and rigs for each well, the purchase of unduly large capacity equipment that would safely care for maximum anticipated flush production, the expense of installing individual gas engines and standard ends, when central powers would have sufficed, the accumulated penalties for untempered haste, etc., apparently can go to make up a penalty in excess of 50 per cent of the corresponding cost for the same property if drilled up and equipped in a conservative manner. Such penalties occasionally may be justified in extremely competitive areas which yield compensative flush.

"It is not desired to compare the cost of developing the Haverhill block with properties of the opposite extreme; the comparison that has been made was merely to set forth the possible margin of waste that may arise from aggressive development."

After describing in detail the expense that was spared because of noncompetitive development, Mr. Harlan summarized his findings as follows:

Development	
Net savings in equivalent dry holes	$252,000
Net savings in drilling expense	63,000
Net savings in pipe line system and lease tankage	23,500
Benefits from purchase discount and standardization	28,000
Net savings in buildings and dwellings	8,000
Net savings in well and pumping equipment	86,800
Net savings in water and gas systems	15,000
Net savings in tool work	9,000
Savings in interest on reduced cash requirements	26,000
Savings in interest on reduced capital investment	81,000
Total development benefits	$592,300
Operation	
Estimated savings in operation and maintenance expenses	$284,000
Production	
Not considered	
Total Benefits	
Total benefits from development and operating economies	$876,300
Total benefits the first three years	769,300
Total benefits remaining life	107,000

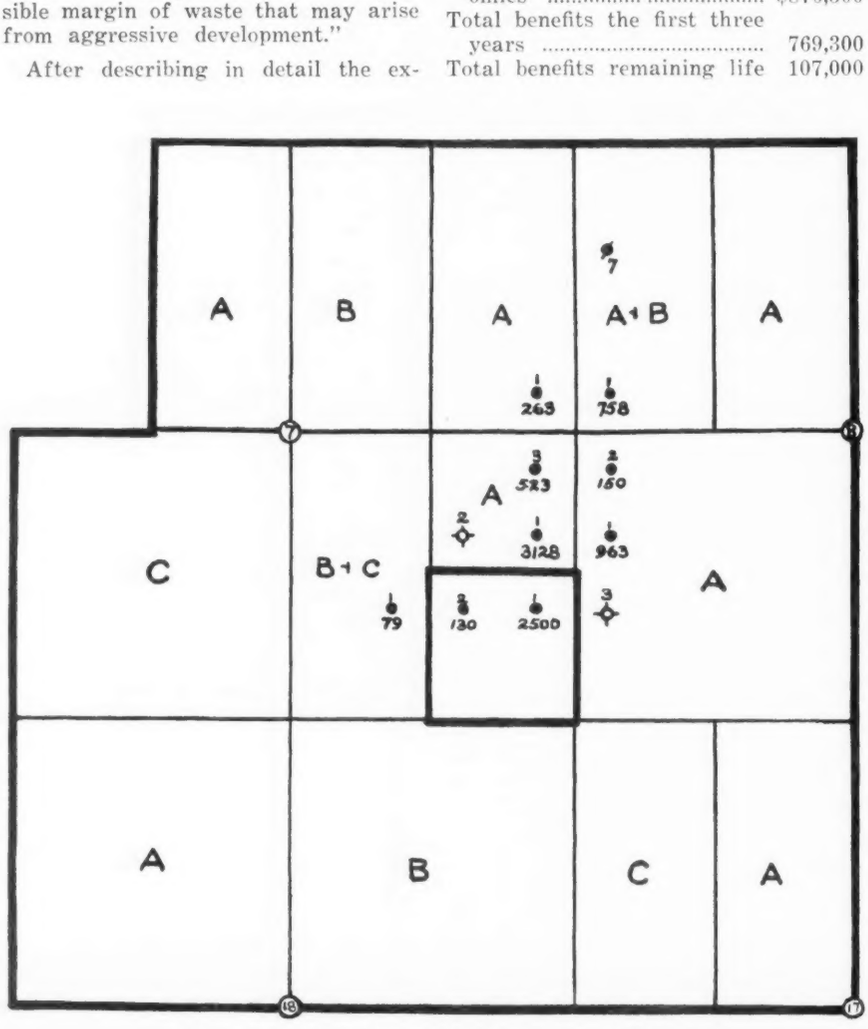


Fig. 2—Outline of a unitized pool in Oklahoma

There are 14 producing leases in the property. Fifty-nine oil wells, spaced one well to 10 acres, and three dry holes have been completed. One well is drilling and probably four more will complete the development of the Haverhill pool.

Southwestern States

Beginning with a definition of unit operation, F. H. Lahee, chief geologist, Sun Oil Co., prepared the report on Arkansas, Louisiana, Texas and New Mexico. He gave this as his understanding of the term:

". . . the development and operation, by one management, of a single entire pool, or reservoir, of petroleum, on a systematic and scientific plan which is best calculated ultimately to extract from the pay sand and bring to the surface of the ground the largest possible amount of oil with the greatest possible total profit. I say 'ultimately' advisedly, for 'unit operation,' further implies conservation, production at a reasonable rate and reduction of losses to a minimum."

First reciting a number of advantages to be had from unit operation, Dr. Lahee said the first object of the method is proper well spacing. He did not confine that to spacing on the surface; rather with reference to subsurface conditions.

In the territory discussed by Dr. Lahee there are many examples of blocks of leases, or of single large leases held and operated by a single company. No pertinent data were available on these, he said. He then told of blocks held by two or more lessees. These more nearly conform to the popular idea of unit operation, of more than one company combining acreage under single management. The other type is interesting as illustrating the economies possible under operation of a pool as a unit, but the problem on which the oil industry is concentrating today is the unification of acreage to avoid competitive and unnecessary expense of development and less than maximum results in the recovery of oil.

In Arkansas, Dr. Lahee said, two unit operations were reported to him. In one case the leases, totalling more than 1100 acres, are checkerboarded over a structure in tracts of from 10 to 80 acres. They are owned by two companies, on a 50-50 basis. One of the companies has done all the drilling.

The other case involved 920 acres in a solid block, originally held by six companies. It was unitized for the drilling of a test, which was dry. The joint operation was dissolved after the test was abandoned, the six companies sharing the expense.

No unit operations of pools were reported from North Louisiana. In Coastal Louisiana and Texas at least 30 salt domes are included, wholly or

in part, in blocks of leases in which two or three companies participate. Drilling is in progress on several of them.

In other parts of Texas, Dr. Lahee cited the following:

The Comanche block, Comanche county, 33,000 acres owned by 10 companies.

The two Overall blocks in Coleman county, one 328 acres owned by five lessees and the other of 2057 acres owned by five lessees.

A unit operation in Ector county, three companies participating.

A block of 10,000 acres in Andrews county, three companies concerned.

A block of 10,000 acres in Kent county, four companies participating.

A block of nine square miles in Loving county, owned by five companies.

Drilling has been or is in progress on all the foregoing.

No unitization plan is in existence in southeastern New Mexico, Dr. Lahee said. One attempt failed because of special drilling obligations. An effort among operators to bring about curtailment of drilling in the Hobbs area, Lea county, was abandoned after the state had interposed an objection to curtailment in any form so long as the state's production was less than its consumption, or words to that general effect.

Details of the methods employed on several of the blocks were given by Dr. Lahee. One of the most interesting, because of its size, was the Comanche block. Ten companies subscribed $4000 each for an undivided 10 per cent interest in the 33,000-acre block, making sufficient capital to pay off on the leases. For each test drilled $2000 is to be subscribed by each member.

Two tests are to be drilled and a third, if the operating committee so decides. The committee consists of a representative of each company and one of the participants was selected as the operator. Each member may take its share of the oil or gas produced, if any is found.

Because the plan of unit operation in the Van pool, recent discovery in Van Zandt county, Tex., was set up after the discovery well was drilled, it occupies an unique position. Usually the unitizing of acreage is accomplished in advance of drilling, when values are unknown and therefore are assumed, in the absence of perfect geological control, to be equal. Dr. Lahee described the Van pool arrangement as follows:

"In this case . . . consummation of the plan was brought about in order to systematize drilling and production through a cooperation plan of well spacing and gas conservation. The plan affects a solid block of nearly 6000 acres which has been outlined as closely as possible, while still following land lines, in conformity with the shallow subsurface structure plotted on scattered core-hole data.

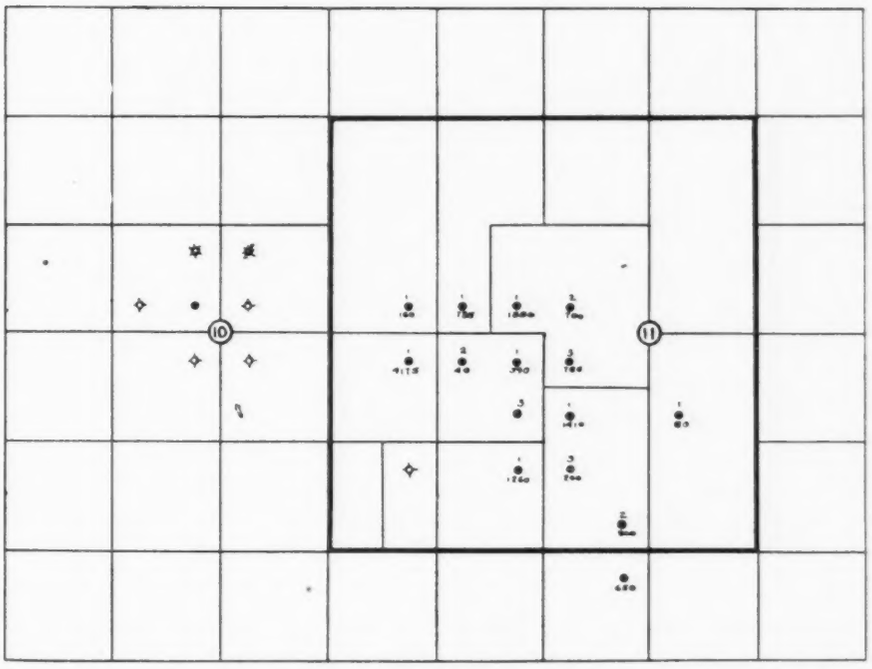


Fig. 3—An Oklahoma unit pool which has produced more than 1,000,000 barrels of oil

"Within this block the acreage holdings are such that the five participating companies own the following fractions of the whole, respectively:—81.70 per cent, 7.75 per cent, 4.51 per cent, 3.57 per cent and 2.47 per cent. The company having the major interest is operating the property.

"All five participants will share in costs and profits on the basis of their fractional interests. For a time these interests will be tentatively based on the amount of acreage originally held by each company, but after there has been time to accumulate data for constructive satisfactory production decline curves, eventually, readjustment of this schedule will be made based on the ratio of the estimated ultimate productivity of the leases owned by each party to the estimated ultimate recovery of all the leases in the block, and readjustment of costs and profits will be retroactive to the beginning of the new schedule.

"In this manner the owners of the more productive leases will in the end reap proportionally greater profits per acre than the owners of the less productive leases. In other words, the parties will benefit in proportion to the more or less fortunate position of their leases in the pool.

"By this method one of the objections often raised to unitization is removed, the objection that prorata distribution of profits based only on acreage may reduce the income of those lease-holders who own the most productive tracts.

"Another point worthy of note in this Van unit plan concerns the pay horizons covered in the agreement. The present operation relates particularly to the Woodbine sand, but not to pay zones which lie below the base of the Upper Cretaceous, i.e., below the Woodbine formation.

"If oil is discovered in paying quantities below the base of the Upper Cretaceous, it is to be developed entirely independent of the upper oil pays, as if it occurred in a separate oil field, but the operations for producing such deeper oil are to be governed after the same manner as those for the Woodbine oil.

"For the final systematic development of the pool, a regular well spacing has been planned, with one well to approximately every five acres. From the total number of proposed locations, those are selected for the first campaign of drilling which seem best adapted to test the many leases, with one well and in a few instances two or three wells to each fee ownership. These locations are chosen in pairs of offsets, rather than as single inside locations, and the pairs are distributed over the block as uniformly as possible."

Dr. Lahee said that unit operation appears to be working very well in Texas, but a majority of the participants are major companies. Various objections are raised by the smaller independents and he believed that their attitude should be taken into account, understandingly and with the intention to be fair with them. He summarized objections to unit development, as expressed in replies to letters sent to 40 or more independent operators:

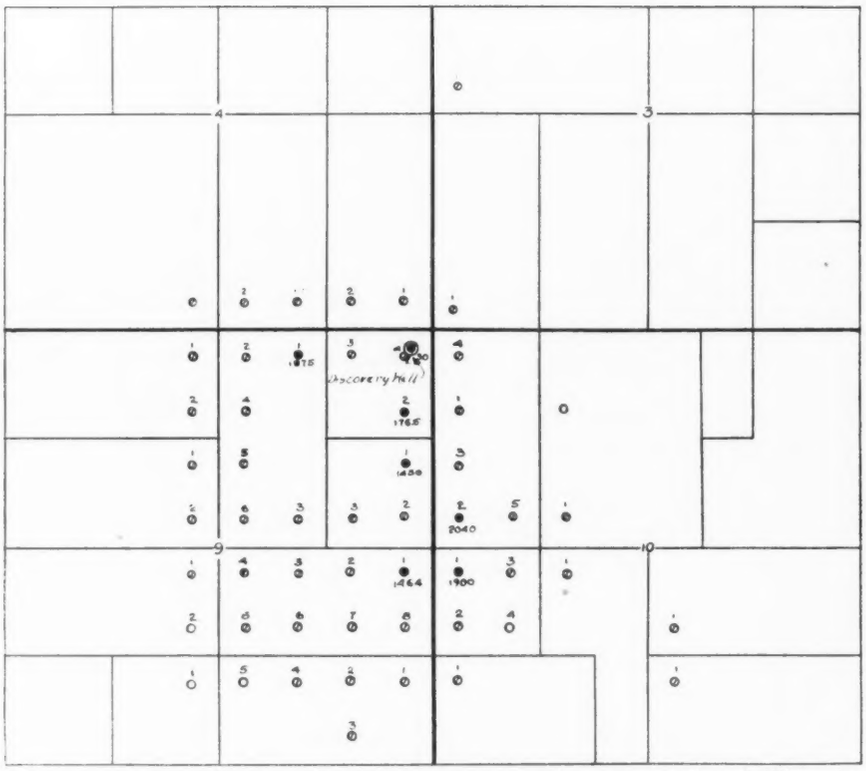


Fig. 4—A non-unitized pool in Kansas illustrating competitive drilling far in advance of production

All independent operators and officials of small companies agree that the unit plan will not work out in practice. It will inevitably eliminate these operators.

The independent, if he strikes oil and has leases to sell, can obtain more money for his leases than for a small undivided interest in a large block. He can drill more cheaply than a big company can because his overhead is relatively small.

He will have no control over operations. He may be forced to postpone development, if the major interests so vote, or he may be forced to contribute his share toward expenses possibly at times when he cannot afford to do so.

He must relinquish his independence.

"On the other side," said Dr. Lahee, "we would point out that the independent operator gains several important advantages in unit plan development, not the least of which are the more certain market available for the oil, the larger ultimate profits, and the opportunity to benefit by the experience of the trained technical and production departments of the larger companies participating."

Rocky Mountain Unit Operation

With Fred E. Wood, of the Midwest Refining Co., as chairman, a detailed study of unit operation in the Rocky Mountain fields was submitted by a committee consisting of J. G. Bartram, C. E. Dobbin, Wilson B. Emery, Charles E. Erdman, R. D. Hawley, E. W. Krampert, Foster Morrell, W. T. Nightingale, K. B. Nowels, C. M. Rath, Earl Shoenfelt, J. W. Steele, E. T. Wilson and J. J. Zorichak. A painstaking study was made. In a letter of transmittal, Mr. Wood said:

". . . we have attacked the problem entirely from the saving in drilling and production cost; for it has been our belief that if we could justify unit operation from this viewpoint alone, any saving in ultimate production would be an additional benefit to be expected by the unit operator.

"There has been so much said about increase in ultimate recovery by unit operation that it seems unnecessary to emphasize this point. There is so much room for controversy regarding the amount of ultimate recovery that the Rocky Mountain committee has not felt justified in placing themselves on record on this point."

Summarizing the committee's several reports, Mr. Wood said:

"Since the earliest discoveries of oil in the Rocky Mountain area the spirit of cooperation in drilling and production programs has prevailed. There has scarcely been a field which has not been developed in an orderly manner through mutual agreement between competitive operators. An appreciable saving has resulted, as many unnecessary wells have been eliminated.

"We have unit operation plans and agreements which were developed at an early date. Rock River, found in 1918, has been a unit operation. One of the first prorate agreements ever attempted occurred in Salt Creek in 1921. Teapot, first developed in 1922, has been a unit operation; the lessor, the government and the lessee, one operator.

"South Casper Creek, first found in 1918, has been developed as a unit. Rex Lake, found in 1923, is a unit operation. The list might be extended materially but it serves to indicate that the Rocky Mountain region enjoyed the fruits of unit operation at an early date.

"It is concluded from this unitization study in the Rocky Mountain region that there is an appreciable saving in both development and production costs as well as the elimination of waste of a natural resource. Certainly, when unit operation conserves an irreplaceable natural resource as well as capital, any legal or political impediment to its successful development will be overcome."

The committee classified the fields under study in four types:

1—Unit operation: Any field whereby the competitive drilling-drainage feature is or will be absent in the development and operation of the pool.

2—Near unit operation: Any plan whereby the competitive drilling-drainage feature is or will be reduced or regulated in the development and operation of the pool.

3—Cooperative agreements: Any agreement whereby production is prorated, expenses pooled, drilling programs mutually curtailed, etc.

4—Undeveloped fields: Any plan which is in progress whereby undeveloped or partially developed fields will be unit or near unit operations.

"In the Rocky Mountain region the committee has endeavored to evaluate the savings in development and production costs," said the summary. "No effort has been made to estimate increased ultimate recoveries. It is our belief that insofar as the Rocky Mountain region is concerned unit operation should be justified through tangible savings rather than the uncertainties of additional barrels of oil. The interpretation of amount of increased ultimate recovery is often a subject of much controversy. Savings in well and production costs cannot be disputed.

"To evaluate savings in development and production through unit or near unit operation, there should be a change from competitive to unit operation or vice versa during the life of the field; or at least the drilling of wells under unit operation should be complete. If these conditions do not exist, evaluation of the savings in drilling and production costs may be based on erroneous and unwarranted assumptions. The committee has not felt justified in evaluating such savings in the near unit operating fields, with the exception of Salt Creek."

Savings effected by unit operating, for development and production costs

CROSS-SECTION VIEW OF ELBOW
SHOWING ITS INTERNAL CONSTRUCTION
WITH NIPPLE AND PACKING NUT COMPLETE
WALL OF ELBOW
CHANNEL THROUGH WHICH BALLS ARE INSERTED IN RACE
PACKING
PACKING SEAT
UPPER END OF NIPPLE SHOWING BALL RACE WITH BALLS WHICH HOLD CONNECTION DURING RENEWAL OF PACKING
PACKING NUT
NIPPLE

Pat. Appl'd For

Now a BALL BEARING Swing Joint

BALLS HOLD CONNECTION WHILE PACKING IS RENEWED

THE cross-section view above shows how this new Swing Joint is made. Observe the upper end of the nipple with its ball race and its flared packing seat. Note that the elbow rides on the balls which hold the connection in place when the packing nut is unscrewed and slipped down on the nipple for repacking.

This new Wheaton Ball Bearing Swing Joint marks a tremendous advance in design. It makes repacking an easy one-man job—without blocking up the pipe line or taking the risk of the pipe falling. And it is the last word in easy swinging.

Send for a sample. If not entirely satisfactory, return it for full credit or refund.

A. W. Wheaton Brass Works, Newark, N. J.

Empire Brass Mfg. Co., Ltd., London, Ontario, Canadian Manufacturers and Distributors

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FAUCETS · VALVES · JOINTS · COUPLINGS · FILLERS · NOZZLES · FITTINGS

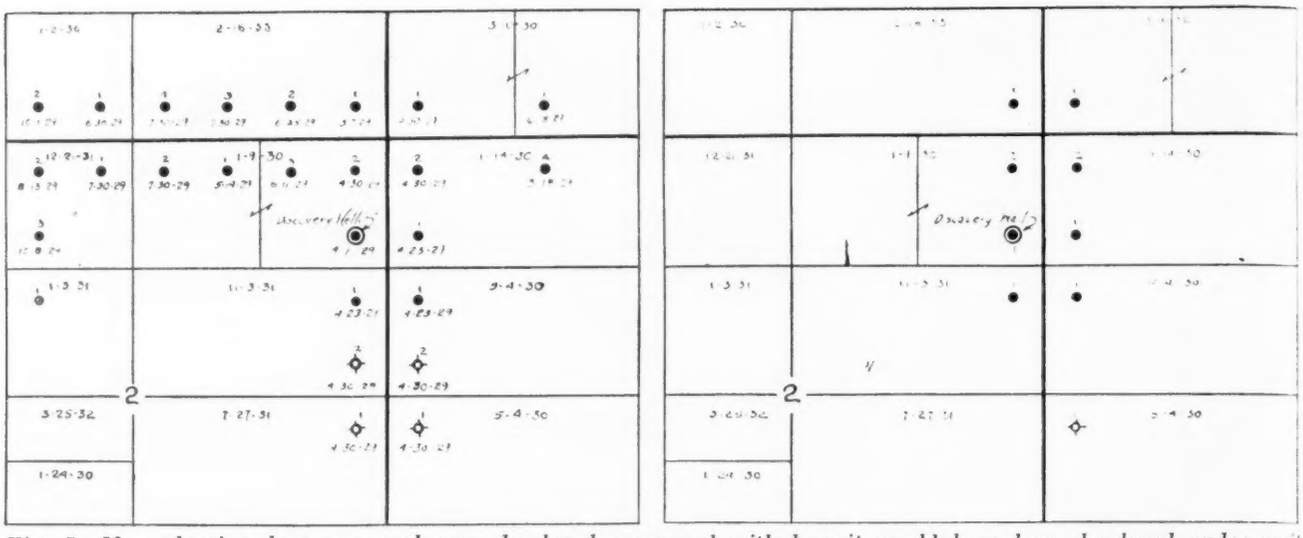

Fig. 5—Map showing how one pool was developed compared with how it would have been developed under unit operation

alone, were set up as follows:

Rock River	$ 5,500,000
South Baxter Basin	1,716,000
North Baxter Basin	272,000
Hiawatha	714,000
Rex Lake	500,000
Salt Creek	11,650,000
Little Buffalo Basin	400,000
	$20,752,000

These figures, said the summary, do not include such savings as reduction in general overhead, field and general office management, elimination of need for increased pipe lines and storage facilities, and gas plants to care for peak production, etc.

The outstanding example of unit operation in the Rocky Mountain territory, is, of course, the Salt Creek field. The committee, as noted, arrived at a figure of $11,650,000 that has been saved in development and production costs because of the unit plans adopted. No effort was made to estimate increase in recovery. "It would require," says the committee, "nearly 20,000,000 barrels of additional oil to be produced in order to return the amount saved by not drilling unnecessary wells."

Four horizons are affected by unit or semi-unit programs. They are:

Horizon	Productive Area in Acres	Discovery Date
First Wall Creek	3,320	1908
Second Wall Creek	20,000	1917
Lakota	2,000	1921
Third Sundance	500	1926

"The principal operator is under contract with six companies to operate 10,400 acres," said the committee. "This includes all of the productive area of the First Wall Creek, Lakota and Third Sundance and a little over 50 per cent of the area of the Second Wall Creek. Nearly 40 companies operate the remaining 9600 acres of the Second Wall Creek.

"In the First Wall Creek sand there have been four wells drilled to each 40 acres. This degree of development has shown economic drainage. If this sand had been developed under competitive operation more wells would have been required. As a result of the single company development, there has been a saving, but it has not been evaluated in this report."

The history of the proration agreement in the field, beginning in September, 1922, was related by the committee. It endured until December, 1923 when pipe line capacity had been expanded to the point where all the production could be taken.

"At this time there were 685 wells in the Second Wall Creek sand," said the report. "Immediately upon abandonment of the conservation committee all companies started drilling campaigns. During the following year nearly 500 wells were completed. These drilling campaigns continued for nearly three years until the total of 685 wells was increased to 1600 wells in the Second Wall Creek sand.

"The policy adopted by the principal operating company was to offset all wells of other companies and to drill the inside acreage only in accordance with the needs of drainage. The development of this company's properties averages four wells to each 40 acres. As a result of competitive operation the other companies with the exception of an area known to be barren of oil have drilled an average of 5.5 wells per 40 acres. Four wells to each 40 acres has proven adequate to economically drain the sand of its oil.

"Had the principal operating company been forced to drill the Second Wall Creek sand at the rate of 5.5 wells per 40 acres, 364 additional wells would have been required. These would have cost $5,460,000.

"If these wells had been drilled they would have been produced at an additional cost of $2,180,000. There was, therefore, a total saving of $7,640,000. Each lease in the Salt Creek field shows diversified royalty and working interests. These were necessarily protected. Had they been merged by some agreement the saving would have been even greater than shown.

"In 1921 the discovery well was drilled into the Lakota sand. As the production was not needed at this time the well was shut in pending the need for further development. The second well was drilled into the Lakota formation in 1924 and subsequent wells proved the productive acreage in this horizon to be within the properties operated by the largest operator.

"From previous experience it was known that the Lakota was highly porous and that even though the wells showed a large initial production (average 2000 barrels per well) it would not be necessary to develop this horizon as intensively as other types of sands.

"To make it possible to drill in accordance with drainage needs, royalties were purchased and efforts made to consolidate diversified interests. The result was that one well to every 22 acres has been drilled in this horizon. No oil was taken except for test purposes until most of the wells had been completed and this horizon was put on production as a unit.

"Excluding any consideration of increased ultimate production as a result of unit production, unit operation saved a total of 110 wells which would have been required had the area been owned by competitive interests. The saving in development cost amounted to $2,750,000. The saving in production cost will amount to $330,000.

"Later development found oil in commercial quantities in what has been termed the Third Sundance. This, like the Lakota, was drilled to properly and economically drain the

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sand. One well per 22 acres will represent the development when the drilling program is completed. Like the Lakota, most of the wells in the Third Sundance were completed before any were produced, except for test purposes.

"The Third Sundance is flowing its production at this time under a high back pressure and sufficient information has been developed to date to indicate that additional wells would be uneconomical. Under competitive operation it would have been necessary to drill at least 28 more wells. The saving resulting from unit operation has been 28 wells, or $840,000 and a production cost of $90,000.

"The above does not account for savings resulting from shutting oil in the ground when not needed, reduction in waste of gas by avoiding high peak production, elimination of need for costly storage and additional pipe line facilities, etc. The total saving of $11,650,000, therefore, is a minimum figure but it serves to justify unit operation from the viewpoint of the oil industry's pocketbook."

South Flank Well on Amarillo Arch Opens Vast Panhandle Area

By Paul Wagner

N. P. N. STAFF WRITER

HOUSTON, Feb. 20

AN OIL well equalling in significance the discovery completion of the Texas Panhandle has been drilled on the south flank of the Amarillo arch by the Empire Gas & Fuel Co.

It is the previously reported[1] No. 1 Fields test, in the northeast quarter of Sec. 13, block 7, I&GN survey, which is now pinched to 185 barrels daily after testing 100 barrels an hour at its maximum.

The Fields test, which had two pays in the granite wash formation at 3200-3213 and 3220-3232 feet, is the first commercial producing well making oil on the south flank of the buried ridge responsible for the accumulation of petroleum in the Panhandle.

Earlier Amarillo district production had been confined to the north flank of the arch in the case of oil, although high pressure gas had been exploited on the top of the ridge and higher up its south flank than the present oil discovery.

Earlier gas wells in the general area of the Fields oil discovery were drilled by the Empire six miles northwest in Secs. 4 and 5, Block 5, on the S. B. Burnett ranch. The Sec. 5 test made 20,000,000 cubic feet daily at 2864 feet and the Sec. 4 test 5,000,000 cubic feet at 2865 feet. In Sec. 20, on the Culberson Brothers tract, the Empire also completed a gasser.

Three and a half north and west of the Fields, an old test of the Humble Oil & Refining Co., in Sec. 12, Block 4, made 20,000,000 cubic feet of gas daily at 3060 feet. Twelve miles southeast, up the flank of the northwest-southeast plunge of the granite ridge, the M. Powers test of Dillard and others in Sec. 248, made 5,000,000 cubic feet of gas at 3250 feet.

Conditions of development, however, are certain to be relatively moderate on the south flank as compared with the north. In the first place, the Empire's discovery was drilled near the center of a block consisting of 15 sections, precluding competitive operations for the protection of lease lines.

The new well will stimulate wildcatting, however, as the Dillard test in Sec. 248 showed for 60 barrels, initial oil production, at the time it was completed in western Gray county.

A question exists among geologists whether the south flank of the arch will produce oil under both such conditions as obtained on the north flank. In the last mentioned area, the granite wash yielded large flashy wells that failed to hold their production over any considerable period of time. Lower on the north flank the lime pay yielded smaller wells of fair staying qualities.

Tests low on the south flank, which in the past have resulted in failures, gave little promise of lime pay production based on chemical conditions of the formation.

The future must determine whether the area is uniformly non-productive in the lime and whether the granite wash is to be the main dependence of the future on the south flank, or not.

In the opinion of some geologists the production contours on the south flank, at the granite wash level, may meander in and out, achieving considerable more productive width as compared with the sharp and steep dips on the north flank. In such case it is conceivable that south side granite wash production would be found on narrow bands, or contours, except where flattening or sub-surface re-entrants occur in the structure.

The condition postulated would make for a number of more or less disconnected development areas for a distance possibly of 35 miles from Gray county northwest along the south flank rather than a narrow area consistently productive.

South flank development will take on none of the "boom" conditions experienced on the north side, where leasing activities were stimulated by hectic land plays of a half dozen major independents getting into the territory for the first time.

There will be no such taking up of hundreds of thousands of acres of wildcat leasehold at costs extending into the millions of dollars, partly because of acreage having been already taken up and partly because of discouragement from operating losses sustained in the earlier development.

Although the Panhandle has already yielded an imposing quantity of crude oil production, in terms of barrels, and many analysts estimate that a billion barrel reserve exists still in the Amarillo district, recovery costs have been high.

The initial expense of high priced acreage, plus development costs in a region of amazing distances affecting transportation, combined to set a first handicap to operators. Then, highly competitive drilling in the block "Y" section, on the north flank, where production declines were rapid, brought further headaches.

Comparative conservation to be found in south flank operations will offset a large part of the north side conditions of handicap, especially because the producing industry in the territory will have past history as a standard on which to rest decisions.

A compilation of operating costs and results, embracing initial expense for leaseholds and general overhead, was made a year ago by one of the larger Texas operators for its own information. That compilation showed the Panhandle territory then "in the red" on its operating balance sheet to the tune of $36,000,000, with increasing deficit as flush production declined and operating expenses grew.

The encouraging feature of the present Fields discovery and the wildcatting certain to be taken up moderately as a result is that operators engaged in testing out the south flank of the arch will "feel their way" and may be expected to experience none of the headaches of "boom" development, certainly not for the present.

[1] NATIONAL PETROLEUM NEWS, Feb. 12, 1930.

F**A. BUSH, paleontologist for the** Sinclair Oil & Gas Co. since 1926, has been moved up to the position of chief geologist to succeed C. A. Yoakum, resigned. Mr. Bush, upon graduation from Stanford University, spent two years in the geological department of the Atlantic Oil Producing Co. before joining the Sinclair organization. Although he is one of the youngest chief geologists of a major company in the Mid-Continent, Mr. Bush has long been recognized as an authority in his chosen field. When Mr. Yoakum resigned the position of chief geologist which he had held for the past four years, he left to become vice-president of the Tri-State Royalty Co. in charge of the land and geological departments.

* * *

Died: M. C. French, 66, oil operator in the Mid-Continent and in Kentucky for the past 20 years, after a brief illness. Mr. French began his producing activities in the Kentucky fields. He was later associated with Waite Phillips when the latter began his rise during the development of the Phillipsville pool west of Okmulgee. Prior to this time he had been interested in mining in Wisconsin and Minnesota. It was due to the opening of lead and zinc mines at Baxter Springs, Kan., that Mr. French came to the Mid-Continent.

* * *

E. A. Cook, former purchasing agent of the Twin State Oil Co., is now serving the Independent Oil & Gas Co. in the same capacity. Mr. Cook had been with the Twin State over 14 years.

* * *

C. R. Barton, vice-president of the Tidal Refining Co., has been appointed vice-president and general manager of the Tidal Refining Co., Tidal Pipeline Co., and Tidal Western Oil Corp. He will be in full charge of all the operations of these companies. He succeeds A. F. Garrett, resigned.

* * *

John D. Clark is to accept the chair of Economics at Denver University following the completion of his post graduate studies at Johns Hopkins University, it has been announced. This step on the part of Mr. Clark is of more than usual interest. He was formerly president of the Mid-West Refining Co. and vice-president of the Standard Oil Co., Indiana, positions which he resigned two years ago to enter a field that had for him a greater personal appeal.

An outstanding success in the business world, he will bring to the realm of pedagogy the practical viewpoint of his former experience. If all institutions of learning could have on their faculties more men with backgrounds like those of Mr. Clark, graduates would have at least one reason for their all consuming ego.

* * *

Oklahoma boasts one federal judge who speaks his mind on any subject. He is Judge Robert L. Williams, one time governor of the state. His latest choice bit, delivered in open court: "I don't like to send a man to the penitentiary. When he gets out all he is apparently good for is to work for old Henry Ford. All he wants is animated machines."

* * *

Political note: The thought has just struck us, as thoughts will at times, that if the coming municipal elections in Tulsa alter the personnel of the city administration it will be one of life's little jokes. Those members of the administration who were instrumental in getting the recent big bond issue passed, may not be allowed to spend it. It would be like getting a raise in pay, and using it to pay for an operation for appendicitis.

* * *

In addition to being a musician of legendary ability, it now appears that the Archangel Gabriel is also a geologist. At least that is the inference which can be drawn from an item in the Inland Oil Index which relates that Clifford Dabney, oil operator, is suing one Mrs. May Otis Blackburn, cult leader, for $50,000 he alleges he was induced to pay her for a book on the location of mineral wealth. The information contained in the book was to have been supplied by the Archangel himself, according to the representations made by Mrs. Blackburn, says Mr. Dabney. He claims fraud.

* * *

A two-day business meeting of the Prairie Oil & Gas Co. district managers was held recently in Tulsa. Sixty-five men attended, representing the various districts in the four states of Kansas, Oklahoma, Texas and New Mexico in which the Prairie operates.

The purpose of the meeting was to bring together the men in the branch and main offices for a round table discussion of their mutual problems.

The men present represented the land geological and scouting departments which in the Prairie organization function under the general leadership of the Land Department.

Improvements in methods of handling form and routine matters were discussed and several suggestions were made which will be given a trial. Such things as company cars were also discussed and the requirements of a car in the various parts of the country covered by the Prairie described by the men who drive them. The meeting closed with a banquet at the Tulsa club.

* * *

Ten Years Ago

(From National Petroleum News, Feb. 25, 1920)

Joseph Seep Purchasing Agency notifies Independent refiners at Warren, Pa. that it will terminate arrangement for crude supply on March 16 which it had been furnishing to these refiners for 17 years.

* * *

Western refiners perfect plan to build pipe line to carry their refined products to market when told that the impending increase in rail rates will make it impossible for them to compete with the Standard pipe lines on long rail hauls.

* * *

A snow remover burning crude oil helped melt snow on New York City streets after a heavy storm.

* * *

A Duval county wildcat of the Empire Gas & Fuel Co. opens up Gulf Coast territory.

* * *

Mid-Continent production of an eastern company was offered for sale at $2,700,000 for 700 barrels settled production daily, or $4000 per barrel.

* * *

New wells in the Peabody-Elbing pool added 10,000 barrels daily to Kansas production, total output in the state being 92,400 barrels daily average.

Oklahoma City Field Potential Jumps To 800,000 Barrels Per Day

TULSA, Feb. 22

THE Oklahoma City pool added several more big ones during the past week and the new pool south of Earlsboro gave some indications that it means business.

A wildcat in the Texas Panhandle, 12 miles from production was the feature of the week for that area. Kansas was fairly quiet. Reports from wells on the west edge of the Voshell pool of McPherson county showed formations running low.

With the completion of more large producers in the Oklahoma City pool, three of them having a combined daily potential of 46,900 barrels, the potential for the pool is estimated as being in the neighborhood of 800,000 barrels per day. That this figure will be increased and perhaps doubled in the next 60 days is evidenced by the following table of operations:

101 wells producing
71 drilling below 6000 feet
42 drilling below 5000 feet
26 drilling below 4000 feet
41 drilling above 4000 feet
5 rigs standing
11 new locations

The present daily average production of around 100,000 barrels is thought by many to be entirely too high. Another meeting of producers is to be held Feb. 24 in an effort toward more drastic proration. If the field as a whole can be held to a figure not to exceed 80,000 barrels it is felt that the ultimate recovery as a whole would be more profitable to say nothing of the effect on the Mid-Continent crude oil market as a whole.

The largest of the week's completions was the Indian Territory Illuminating Oil Co. No. 2 Fortson, in 24-11N-3W. Topping the Arbuckle lime at 6036, it flowed 22,938 barrels the first 24 hours from a total depth of 6521. The well is cutting 1 per cent emulsion and 2 per cent water. Another lime well of the same company, the No. 4 Fortson, NE SW NE of 24-11N-3W, made 7740 barrels of oil, with 3 per cent emulsion and 1 per cent water its first 24 hours.

The only detritus, or sand well of the week was the Cromwell-Franklin No. 2 Trosper, SW NW NW, 12-11N-3W. Like the others, it was a noble well. It made 16,254 barrels the first 24 hours from the sand at 6328 to 6410.

If the 71 wells listed above as being already below 6000 feet come in with initials as large as the three wells completed during the past week, the field potential will jump to over a million barrels. Add this to what it already produces, and the daily potential average gets clear outside the bounds of all decency. Drilling 6500-foot holes on every ten acre tract is liable to prove an expensive program unless the oil is taken from the sand in small enough doses to maintain a price.

Proving that its earlier sterling performances were not a freak the discovery well of the Amerada Petroleum Corp. et al. in the SE NE NE of 22-9N-5E, continued to do its stuff when opened up the morning of Feb. 22 after the required 16-day shut-in. Sixteen hundred and five barrels was what it made in six hours, enough to put it right up in the bald headed row at any gathering of oil wells.

The co-discovery well of the pool, Magnolia Petroleum Co.'s test in the NE NW of 23-9N-5E, continues to make its 100 barrels per day on the pump in accordance with the agreement. This is all the Magnolia will produce until the first offset is drilled in.

The restrictive agreement which has been set up to cover this new area, which lies immediately to the south of the Earlsboro pool, allows the wells to be produced to 70 per cent of their capacity until the new pool reaches a total daily production of 20,000 barrels. When this point is reached the field will be brought under the same proration rules as govern the other flush field of the Seminole area at the time.

IN THE Texas Panhandle lease brokers and the royalty "hounds" are having an inning after having been on the bench for some time. The cause of all their activity is the wildcat well of the Empire Oil & Refining Co., in southeastern Carson county. This well, No. 1 Fields, Sec. 13, Blk. 7, I. & G. N. Survey, which came in last week flowing at the rate of 70 barrels an hour, is now pinched in to 150 barrels per day. A back pressure of 215 pounds is maintained by the use of a ½-inch choke.

Twelve miles from the nearest production, and south of the granite ridge it is the most important find in that part of the country since the discovery of the Finley pool in Gray county. Great blocks of acreage that were about to be written off as "hardly possible" have assumed a new importance. A wildcatting campaign is in prospect, which will test this country south of the granite ridge thoroughly. The Cockrell-McIlroy Oil Co. has already started a well in the NE SE of Sec. 11, Blk. 7, one mile northwest of the new well.

Over in Gray county another well is causing a flurry of drilling. This well the Magnolia Petroleum Co. No. 3 Wright, in Sec. 12, Blk. 3, I. & G. H. Survey, was completed two weeks ago for an initial of 7200 barrels per day. It is on the north edge of the Finley pool. Six new wells are now on the way down to the same pay, and four more locations were announced this week.

THE best completion of the week in the Panhandle was the Robinson & Devore No. 1 Saunders in Sec. 40, Blk. 3, I. & G. N. survey, Gray county. It made 835 barrels in 17 hours from a total depth of 3075. The well was then shut in. Tankage is being erected, although the well will probably be pinched, as the pipe lines refuse to take more than 100 barrels per day.

Reports from the Voshell pool, of Mcpherson county, Kans., indicate possibilities that the western edge of the field may lie along the center of Sec. 9-21-3W. Two wells drilling half a location west of the center line of the section are reported as getting the chat on top of the Mississippi lime about 100 feet lower than the producing wells which have been completed in the pool.

The rest of Kansas was pretty quiet. The Schurr pool, of Rice county, is about as active as any outside of the Voshell area. This pool has aroused interest in the possibilities of siliceous lime production in the western part of the state, and several wells are drilling.

Notes on the Week

Rush county, Kansas, has a well with a small showing of gas which is serving to attract a certain amount of attention. The well is the Milmac, Shaffer et al. No. 1 Eitel in 11-18-6W. The showing amounted to about 500,000 cubic feet from an unidentified sand at 2325 feet.

* * *

Payne Drilling Co. has a wildcat showing for a well in a test west of the Asher pool in 22-6-3E. The Simpson was reported at 4100 feet, with a good showing of oil.

* * *

The wildcat being drilled by the Homaokla Oil Co. in the SE NE NE of 16-5-3E, McClain county, is drilling around 3730, with several hundred feet of oil in the hole.

Tonkawa A.P.I. Elects Officers Hears Paper on Gasoline

By John Power
N. P. N. STAFF WRITER

TONKAWA, Feb. 20

THE election of officers for 1930, and a paper on "Natural Gasoline Production, and its Relation to the Field," by S. S. Smith, Shell Petroleum Corp., occupied the regular monthly meeting of the Tonkawa Chapter of the American Petroleum Institute, Division of Production, held at Tonkawa the evening of Feb. 19.

O. L. Stevenson, Gypsy Oil Co., was elected chairman, succeeding C. M. Copeland, Comar Oil Co. W. F. Knode, Shooters Torpedo Co., was elected vice-chairman to succeed Mr. Stevenson, the new chairman. S. H. Pope, Gypsy Oil Co., was elected secretary, to succeed R. M. Dannenburg, Comar Oil Co.

A new program committee was also appointed. It consists of Mr. Copeland, Seth Kemp, Blackwell Oil & Gas Co.; and L. J. Davis, Frick Reid Supply Co.

Mr. Smith's paper outlined to the field men present, most of whom had had experience only with oil production, the various processes involved in the manufacture of natural gasoline, and in addition pointed out to them several places where better cooperation and understanding of each other's problems would work to their own advantage, and to the advantage of the company that employed them. Couched in simple, nontechnical language, the paper was accompanied by a chart of a typical absorption plant.

In most company organizations, said Mr. Smith, the oil and gas traps are operated by the production men, who therefore control the source of supply of the gasoline plant. If, he said, crude oil is allowed to "kick over" into the gas gathering line at the separator, it is quite likely that the charge of mineral seal oil in the absorption plant will be considerably damaged, and its efficiency lowered to a point where it will seriously affect the gasoline production of the plant. Rerunning or replacing the mineral seal oil is an item of considerable expense, so he urged that the field men pay particular attention to this detail.

Another source of trouble, he said, particularly in the older fields, is the lack of residue for field operations. It is common practice, he said, to shut the plant gathering lines any time the gas requirements fell off on any particular lease. This makes things immediately worse for everybody concerned, he said, as it reduced the plant's total supply for both gasoline production and residue by just that much, although it might relieve the lease in question for the time being.

Residue troubles, he said, come at times when the weather is most severe, and at times when it is most difficult to make repairs on field lines, or on wells that are off. During the early part of the working day, said Mr. Smith, most of the trouble with residue supply develops, as this is the time when the demand is heaviest. Powers which have been shut down overnight are started up; workmen are turning on all their stoves to warm their houses and to cook the morning meal.

The remedy suggested by Mr. Smith was cooperation, and a better understanding of each other's problems. He said "Any place in the field that you men can cooperate to the extent of saving the early morning load on the gas will be a help. Such a saving will mean a few additional feet of gas for the necessary operations of getting the field running. Any place the plant operators can save gas consumption in the plant, or distribute the gas supply better, or arrange lines to get the gas back on your leases at more favorable points, are steps in the right direction.

"My sole suggestion to all of you is, that where troubles of this sort exist, you and the plant men make reasonable efforts to get together and discuss the whole proposition. This will solve more problems than any arbitrary rules that can be laid down. It will also go far toward showing each department how useful it can be to the other. Many of our troubles and misunderstandings are quite imaginary, and can be easily prevented if departments work together."

In the discussion which followed the reading of his paper Mr. Smith told the members of the Tonkawa chapter of some of the technical problems which the natural gasoline men were trying to overcome, as well as giving them side lights on that phase of the oil industry. He told them, too, of some of the by-products which have sprung up in the past few years, and of some of the chemical and industrial uses to which these by-products are being put. Most of those engaged in the natural gasoline end of the oil business think of it primarily as a manufacturing industry, he said.

35 Appointed on A. P. I. Publicity Board

NEW YORK—The public relations advisory committee of the American Petroleum Institute, announced recently, consists of 35 men who are in charge of public relations or advertising departments or as major executives, and editors of trade magazines. A group of 10 men had formerly worked with the department in an advisory capacity. Members of the committee follow.

Northrop Clarey, of the Standard Oil Co. of New Jersey, New York, is chairman of the committee.

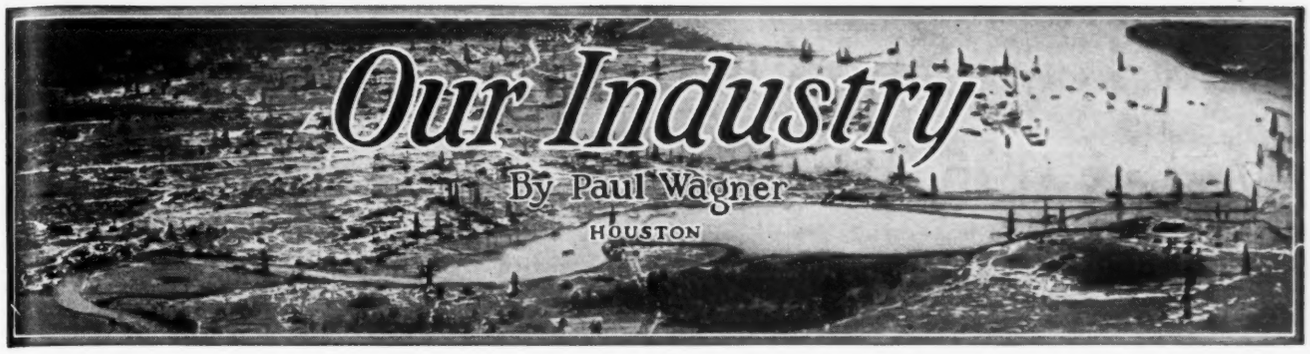
Members representing oil companies are: L. D. Jurs, Associated Oil Co., San Francisco; Joseph R. Rollins, the Atlantic Refining Co., Philadelphia; E. I. Reeser, Barnsdall Corp., Tulsa; W. H. Ferguson, Continental Oil Co., Denver; Earl W. Hodges, Henry L. Doherty & Co., New York; W. V. Hartmann, Gulf Refining Co., Pittsburgh; B. H. Brown, Humble Oil & Refining Co., Houston; B. H. Stephens, Magnolia Petroleum Co., Dallas.

E. G. McKeever, Pan-American Petroleum & Transport Co., New York; L. S. Westcoat, the Pure Oil Co., Chicago; Harry W. Berdie, Richfield Oil Co. of California, Los Angeles; W. R. Francisco, Shaffer Oil & Refining Co., Tulsa; J. H. Brookmire, Shell Union Oil Corp., New York; Glen Winship, Sinclair Consolidated Oil Corp., New York.

Glen Condon, Skelly Oil Co., Tulsa; Philip H. Patchin, Standard Oil Co. of California, San Francisco; Conger Reynolds, Standard Oil Co. (Indiana), Chicago; Max H. Leister, Sun Oil Co., Philadelphia; W. S. S. Rodgers, The Texas Co., New York; W. C. Franklin, Tidal Companies, Tulsa; and Charles A. Moser, Vacuum Oil Co., New York.

Members representing the trade press are: Albert A. Scheg, California Oil World, Los Angeles; Ray Dudley, Gulf Publishing Co., Houston; A. J. Hazlett, Inland Oil Index, Casper, Wyo.; Ward K. Halbert, Irving-Cloud Publishing Co., Chicago.

Warren C. Platt, NATIONAL PETROLEUM NEWS, Cleveland; Edwin Higgins, Oil Bulletin, Los Angeles; William Gretzinger, Oil Field Engineering, Philadelphia; Spencer W. Robinson, the Oil Weekly, Houston; John M. Egan, Oil and Gas Journal, Tulsa; Joe L. Dwyer, the Petroleum Engineer, Tulsa; Russell Palmer, Petroleum World-Oil Age, Los Angeles; Paul Hedrick, Tulsa World, Tulsa, and R. W. Crowly, World Petroleum, New York.



THE Magnolia Club, an inter-office organization of employees of the Magnolia Petroleum Co., at Dallas headquarters, has elected the following officers for 1930: J. L. Green, president; D. A. Little, vice president; Dan Ferguson, treasurer; and Ivan B. Perry, secretary. Besides the aforementioned the board of directors includes C. E. Long, Harry Dean, Ed McHale, Misses Daisy Weaver and Rena Threlkeld.

* * *

Dan J. Harrison, individual operator in the Gulf Coastal oil territory of Texas, with Houston headquarters, doesn't believe in governmental aid for the producer, whether by state or federal legislation. As frequently stated by him publicly, Mr. Harrison sees no end to governmental grasping for authority once it has been allowed to enlarge its foothold. At a recent conference in Austin, which Mr. Harrison attended as a participant, he set forth his platform in a plea for "less aspirin and more salts."

* * *

R. T. Lutz, formerly stationed at Vernon, in the Wichita Falls district, for Humble Oil & Refining Co., has been transferred to Tyler, in East Texas territory. He is identified with scouting and leasing activities. The transfer also changes the business office of "The Swab," a monthly periodical of the National Oil Scouts Association of America, from Vernon to Tyler. Mr. Lutz is editor of that publication. "The Swab" will continue, however, to be printed and mailed at Wichita Falls.

* * *

Dee H. Donnell, formerly its vice president and general manager, has been elected president of the Drane-Humphrey Co., tank distributors and anti-corrosion engineers with offices at Fort Worth and San Angelo. Mr. Donnell succeeds S. H. Humphrey, who resigned as president because of his health. Mr. Humphrey, however, retains his interest in the company and a place on the board of directors. C. O. Gibson is now vice president and general field manager of the company. M. N. Taylor is secretary-treasurer in charge of the San Angelo office.

A. M. Wyatt is now scouting the southern part of the West Texas Permian salt basin territory for Atlantic Oil Producing Co., making his headquarters at Fort Stockton, Pecos county. He was recently transferred there from Wichita Falls.

* * *

Overton Black, formerly at San Angelo for the Phillips Petroleum Co., is now scouting West Texas territory with Midland as an operating base. The Phillips Company has transferred Dave Hemsall of its land department from Sweetwater to Tyler, in East Texas.

* * *

Harry W. Maxwell, assistant to Vice President J. Edgar Pew of the Sun Oil Co., now makes his headquarters at Philadelphia, following Mr. Pew's recent removal there. Mr. Maxwell is Mr. Pew's chief assistant handling executive detail for the Venezuela Sun Oil Co., operating in South America, Mr. Pew being president of that subsidiary of the parent Sun Oil Co. Mr. Maxwell was for many years in charge of California operations of the Sun and still keeps an oversight on that territory, which is in direct charge of Harry W. Davis at Los Angeles.

Dee H. Donnell

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E. M. King, formerly engaged in scouting work of Phillips Petroleum Co., at Midland, West Texas, has been transferred to New Mexico. He makes present headquarters at Roswell.

* * *

John Hays Hammond, internationally known engineer and father of Harris Hammond, president of the Mexican Seaboard Oil Co. of Maine, is traveling in South America. The elder Mr. Hammond, who founded the Mexican Seaboard, first gained a worldwide reputation in the building of the South African empire under the late Cecil Rhodes.

* * *

Fred W. Gerwick, formerly stationed at Mirando City in the Magnolia Petroleum Co.'s producing department, has been transferred to the Luling, Texas, district.

* * *

Harold K. Greenleaf, division land man for the Phillips Petroleum Co., has returned to his West Texas headquarters after a honeymoon trip to Havana, Cuba. His bride was formerly Miss Sixie Hall of San Angelo.

* * *

Joe Hemphill, formerly of the Continental Oil Co. scouting forces, has succeeded John F. Hornbeck in Midland territory of the Vacuum Oil Co. Mr. Hornbeck has been transferred to the San Antonio district land department of the Vacuum.

* * *

H. W. Cowger, superintendent of the Standard Gasoline Co.'s Ventura division is the 1930 president of the Ventura Kiwanis club. Last year he served as vice president and program chairman.

* * *

James L. Jones, recently at Shreveport for the Southern Crude Oil Purchasing Co., subsidiary of Pan American Petroleum & Transport Co., has returned to San Antonio, in charge of its southwest Texas land and leasing division. He is a brother of C. B. Jones of the Southern Crude's geological department at San Antonio.

Flow Tests Show California Can Produce 1,095,386 Barrels Per Day

By Jack N. Westsmith
N. P. N. STAFF WRITER

LOS ANGELES, Feb. 21

SIX-DAY open flow tests of flush fields indicate that California is capable of producing 1,095,386 barrels of oil per day. Flush fields are capable of producing 664,966 barrels per day, settled fields 365,420 barrels per day and Kettleman Hills 65,000 barrels per day.

The proration goal of the state for the next three months has been set at 609,000 barrels per day. If this is achieved a 45 per cent cut under the state's potential will be necessary. This would amount to 486,786 barrels daily.

With present dissention in the ranks of California producers such a large cut in output looks like a "big order." Failure has not been predicted yet in the voluntary effort at proration, but the general feeling of uncertainty continues.

Meanwhile the gas conservation law still is inoperative. The question of constitutionality of the law has been taken under advisement by Superior Judge Hazlett. He will announce his decision on that point March 12.

Announcement of results of open-flow tests at Santa Fe Springs and Long Beach gave operators a disagreeable surprise. It had been expected that the tests would indicate that the fields could not make former potentials. But the actual output fell so far short that it now is apparent that there has been little curtailment of production. The Clarke zone at Santa Fe Springs, particularly, failed to live up to expectations.

Following is a statement of production from deep zones at Santa Fe Springs Feb. 17 during the open flow test:

Zone	Production	No. Wells	Average
Nordstrom	4,994	9	*555
Buckbee	8,540	14	*610
O'Connell	72,889	84	868
Clarke	127,188	156	815
Total	213,611	263	812

*Majority of wells not opened up.

In addition to this deep zone production there are 214 wells shut in with a total estimate potential of 33,879 barrels that were not opened up during the flow test and hence not included in the tentative potential for the field of 228,405 barrels.

An accompanying table shows the former estimated potential for Santa Fe Springs by companies, the volume of production allotted and the new tentative established potential resulting from the flow tests. In addition the amount of shallow well production shut in is given. Compared with these figures is the theoretical shut in production during the last half of January and the excess production accumulated by each company.

The table shows quite clearly that some companies made little effort to comply with the curtailment measures of the field's umpire. Instead of having cut production from a possible output of 370,711 barrels per day down to 165,000 barrels per day, the cut was only from 262,284 barrels per day.

Although no official figures have been announced on the result of the 6-day flow test of the Long Beach field, it is reported that the total output was 156,880 barrels per day, of which 101,000 barrels was produced from the deep sands. This indicates that curtailment measures in the field since November had been only 32 per cent effective.

Partial flow tests at Ventura Avenue enabled the umpire to set the potential production of the field at 74,170 barrels per day. This figure does not vary greatly from the estimated possible output, and the field is not expected to give any trouble. Following the production tests, curtailment efforts reduced the output to 50,960 barrels daily. It is expected that when proration schedules for the remainder of 1930 are passed upon by the general Committee of Fifteen, Ventura Avenue will be cut down to about 45,000 barrels per day.

Seal Beach, which is controlled by a few of the major companies established a potential production of 41,053 barrels during the flow tests. During the first part of the curtailment move, initiated in November, Seal Beach production was reduced to under 25,000 barrels but later the allowable output was raised to 28,000 barrels. It is expected that the new schedules will allow less than 25,000 barrels for the balance of the year.

In the Umpire's "dream field" of Elwood, where cooperation is the password, daily production has been reduced to 38,630 barrels and is expected to be down to the desired figure of 37,363 set as the allowable for this field following the establishment of a potential production of 64,580 barrels.

In order to show to a favorable advantage when potential production is being taken into account by the Fact Finding Committee, General Petroleum Corp. has opened up over 40 wells on its lease No. 2 of the Lost Hills field and is reported to have made preparations to open up a similar number on lease No. 1.

Although these wells are shallow producers capable of making only 25 to 50 barrels each of 17 to 18 gravity oil per day, the company feels that during the seven years the wells have been closed in offset companies have drained a considerable quantity of oil from beneath General Petroleum's land. As there is very little demand for this low gravity crude the company is reported to be willing to shut down again provided other companies in the field do likewise.

The question of a suitable procedure in the San Joaquin Valley fields has become rather vital as companies with no production in the light crude fields of the Los Angeles Basin and Coastal fields cannot see their way

COMPARISON OF NEW POTENTIALS IN SANTA FE SPRINGS WITH FORMER ESTIMATED POTENTIALS

(All figures in barrels per day)

Company	Allotted production Feb. 1-15†	Tentative Established potential† Estimated potential†		Potential shut-in prod.*† shallow wells	Theoretical shut-in-prod.	Excess prod. Jan. 15-30
Associated	4,415	10,555	8,324	223	4,132	151
General Pet.	31,866	85,683	53,880	10,337	32,351	5,082
Geo. F. Getty	10,280	27,642	15,487	475	5,682	5,291
Richfield Co.	3,110	7,937	5,824	.....	2,714	3,726
Shell Oil Co.	7,588	20,042	12,036	3,100	7,548	159
Standard Oil Co.	11,322	30,197	13,484	4,354	6,516	**73
Texas Co.	14,745	39,057	15,720	6,027	7,002	2,557
Union Oil Co.	20,596	55,101	43,772	8,658	31,934	1,065
Wilshire	10,000	24,539	20,833	175	11,008	6,199
Others	36,078	69,778	39,045	530	3,397	**362
Field total	150,000	370,711	228,405	33,879	112,284	23,715

*Not included in tentative established potential. †As reported by umpire. **Under production.

to curtail their daily output and yet the companies with production in only the high gravity fields cannot see why this comparatively valueless heavy crude from "the Valley" should add to the overproduction problem.

Standard Oil Co.'s wildcat, Mascot No. 1, on Sec. 26-32-23, near Taft, is drilling below 9046 feet in hard brown shale. This deep test of the San Joaquin Valley is being drilled with a 5-inch bit and it requires six hours to make the trip down into the hole or twelve hours for the round trip. Oil and gas showings that were reported at shallower depths failed to continue to the lower levels and it is expected that the hole will be abandoned.

A writ of mandamus has been petitioned from the California Supreme court to force Surveyor General Kingsbury to issue state tideland permits on the Pacific Coast near Capitan, 15 miles north of Santa Barbara and in the same district as General Petroleum Corp.'s Erburu well, which gave promising showings several months ago.

It is the contention of the surveyor general that the part of the coast in question is a continuation of the known structure of Elwood, although the state oil and gas supervisor is reported to have stated that the Capitan district is a distinct and separate field.

Preparations are being made to start approximately 25 wells in the Playa del Rey district, southeast of Venice. Ohio Oil Co. is drilling ahead in its No. 2 well with its discovery well shut in, and Union Oil Co. the only other holder of land outside of the incorporated area, is getting ready to start its first well.

Sunset Pacific Oil Co.'s No. 2 in the townlot area at Potrero has run in a 5-inch liner to the bottom at 5066 feet and an attempt will be made to recomplete this well which came in several weeks ago for about 1300 barrels of high gravity oil per day, but which, like other completions in this district, soon sanded up. Intermingled oil and water sands prevent successful completions being obtained in the district although there are a few wells making between 50 and 100 barrels per day, many of which came in with an initial production of several hundred barrels.

New completions in the Clarke sand at Santa Fe Springs have proven very disappointing to operators who predicted great possibilities for the deep sands. Lack of "kick" of wells favorably located on the structure causing a low initial daily production of new wells has failed to supply sufficient oil to offset the natural decline of previous completions.

Whereas the first wells brought in from below the 7900 foot level averaged from 3000 to 5000 barrels per day and in some instances made as much as 10,000 to 11,000 barrels, recent completions have not averaged over 2500 barrels and very few large wells have been obtained.

General Petroleum Corp. completed its Santa Fe No. 137D and 191D at 8000 feet and 7950 feet for 1500 barrels and 850 barrels respectively. The Texas Co. completed its Foix 7 on top of the structure for 600 barrels from a depth of 8000 feet.

The Jergins Trust Co.'s No. 27 at Signal Hill is swabbing with the bottom of the hole at 8500 feet. Other very deep tests of California fields have thus far failed to find commercial production although there are two wells producing from below the 8300 foot level.

On the Western Front

By Jack N. Westsmith
Los Angeles

C. A. COSBY and O. F. Gaylord, of the Rio Grande Oil Co.'s Long Beach office are reported to have reached an agreement to disagree on the question of their relative duck hunting abilities. Notwithstanding the addition to Mr. Gaylord's armament of a new shot gun he was unable to bag a limit of the elusive fowl. He expects to do better however when he gets to know the tricks of the new gun.

* * *

John R. Keane, executive of Richfield Oil Co. has been reelected president of the Western Asphalt Association. Other officers elected were: L. P. St. Clair, W. E. Hall, J. C. Graves, vice presidents; F. P. Smith, treasurer; and M. P. Heaney, secretary manager. The directors of the association include: J. B. Arthur, A. F. Brough and Martin Madsen.

* * *

Bernard B. Smith was recently reappointed to the position of register of the U. S. Land Office, Southern Division of California.

* * *

W. J. A. Reuhl, engineer of the Bataafsche Petroleum at the Hague, Holland, a subsidiary of the Royal Dutch Shell Oil Co., has been spending a considerable time in California looking over drilling and operating practices on the Pacific Coast.

* * *

A. J. McCloskey, recently appointed South American representative for the Lucey Products Corp. is in the Mid-Continent studying drilling methods so as to be able to tell the natives how it is done in these United States.

* * *

Roscoe McCabe, in charge of the Santa Maria office of the State, Supervisor of Oil and Gas recently resigned to devote his time to private interests. S. G. Dolman has been transferred from Los Angeles to take charge in Santa Maria.

* * *

R. E. Beckley, general superintendent of the Standard Gasoline Co., and president of the California Natural Gasoline Association, with headquarters in Los Angeles, has returned from a business trip through the San Joaquin Valley and to San Francisco.

* * *

J. Paul Getty, general manager of George F. Getty, Inc. is expected at his Los Angeles headquarters about March 1, following an extended European trip.

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Hale B. Soyster, supervisor for the United States Geological Survey in the Mid-Continent, has returned to his headquarters at Muskogee, Okla., after a trip to the Pacific Coast.

* * *

J. D. Hartman was recently elected president of the Employees' Association of the General Petroleum Corp. Other officers elected for the coming year include: A. D. Ketcham, first vice president, Miss Agnes McCoy, second vice president, C. D. Graves, third vice president, Wm. Carter, secretary, and J. Holihan, treasurer.

* * *

Charles Stark, formerly tax agent of the Shell Oil Co., has opened offices in Los Angeles to handle municipal and county tax problems.

Mr. Stark made his first direct contact with the oil industry when he became associated with Balfour Guthrie & Co., in 1912 managers of the California Oilfields, Ltd. Later when Shell acquired the "Limited" properties at Coalinga he joined the new organization and witnessed its growth from a small operating company to its present position in the California industry.

Older Seminole Fields 80% Depleted; Recoveries Per Acre High

By William F. Lowe
N. P. N. STAFF WRITER

TULSA

PRESENT statistics on the recovery per acre in the Seminole area of Pottawatomie and Seminole counties, Okla., indicate that some of the early predictions were not such wild guesses after all.

Many of these early estimates have already been reached and others have been passed as the pools have held up beyond expectations. The result is that new records are being made in ultimate yield per acre per pool, for pools producing under similar conditions.

There are any number of fields in the United States that will pass individual pools of the Seminole area in total production, but the number that will exceed the ultimate yield of the Greater Seminole field are decidedly few.

In Oklahoma there are at least three pools that have at the present time a greater recovery per acre than any of those shown herewith. Tonkawa with over 31,000, Hewitt with 22,000, and Healdton with 21,000 barrels to the acre are considerably above most of the present Seminole figures. The comparison however, is not a fair one for all had a greater number and greater thickness of producing sands, as well as a much higher gas pressure.

Because of the almost universal practice of flowing the wells of the Seminole area by air or gas lift, the argument still rages as to whether the large recovery is a direct result. Proponents of this production method insist that the ultimate yield was increased by as much as 10 per cent. It is not at all impossible, except to prove, and it certainly is true that this method prolonged the flush period. Since many of the wells, when drilled in did not flow until gas lift was applied, it appears that the production to date could not have been as great without its use.

On the other hand, a study of the producing sands and of the erratic behavior of wells in the various pools, gives rise to the conclusion that gas lift played but a minor part in the production records. Local porosity was one of the controlling factors. Individual lease and well figures lend considerable support to this contention.

The outstanding example in the Seminole City pool is the Killingsworth lease of the Carter Oil Co., in 23-9-6. Drilled in the fall of 1926, this 120-acre tract has produced a total of 7,476,000 barrels, or an average of more than 62,000 barrels to the acre. This average is not representative of the 12 wells however, for two of them contributed more than 60 per cent of the total.

In the same pool the Pure Oil Co. has obtained from its 160-acre Strothers lease in 26-9-6, a total of 7,711,000 barrels, or a per acre yield in excess of 48,000 barrels. As in the case of the Carter lease, the major portion of the production has come from but a few wells.

There are other leases in the Seminole City pool with similar records of individual well performance, though few are as spectacular as the ones given above. Most of them owe their large recovery to a local sand condition rather than to a production method.

The producing horizons, the Hunton lime and the Seminole Wilcox, possess those tricky characteristics which make for lack of uniformity in well initials and yields. The former is full of solution cavities that are common to a limestone which has been subjected to surface weathering and erosion. The latter, a dolomite sandstone, is in itself a lens and, though fine grained and comparatively hard, it contains many soft streaks of unconsolidated sand. It is these cavities and streaks with their intervening tight or dry spots that have caused the wide variation in well production.

An interesting study of lease recovery, based on an assumed thickness and porosity of the Seminole Wilcox sand, was made recently by J. R. McWilliams, petroleum engineer of the Skelly Oil Co. His table on the leases of that company in the Earlsboro and Little River pools accompanies this article (See Table No. 1).

In only two of the Skelly wells, the Carl No. 1 and Lottie No. 2, was the "Wilcox" drilled through. In the former it showed a thickness of 32 feet and in the latter 38 feet, so an average of 30 feet was used in the table. This figure might be applied with a fair degree of accuracy in the whole area. The per cent of porosity assumption is based on the figures of Dr. A. F. Melcher who estimates the porosity of the Wilcox sand as varying between 14 and 30 per cent.

Some of the greatest individual well records of the whole Seminole area have been made in the Earlsboro pool. In 15-9-5, the No. 2 Anderson of the Amerada Oil Corp., has made a total of 1,916,000 barrels, while the other four wells on the lease were putting 384,000 bar-

Table No. 1—Recovery Statistics of Seminole Leases of Skelly Oil Co.

Lease	No. Wells	Avg. Penetration	Present Daily Production Barrels	Gross Production	30′ Wilcox 20% Porosity 100% in Sand in Barrels	30′ Wilcox 20% Porosity Percent Recovery	30′ Wilcox 25% Porosity 100% in Sand in Barrels	30′ Wilcox 25% Porosity Percent Recovery
Spencer (Earlsboro)	2	18′	350	1,010,618	933,420	108	1,400,140	72
Carl (Little River)	2	22′	1,260	720,967	933,420	77	1,400,140	51
Cherry (Earlsboro)	4	17′	243	816,735	1,866,840	44	2,800,280	29
Shepherd (Earlsboro)	4	16′	1,625	691,976	1,866,840	37	2,800,280	25
Mayes (Earlsboro)	4	13′	349	675,906	1,866,840	36	2,800,280	24
Lottie (Earlsboro)	3	21′	400	439,317	1,460,130	31	2,100,210	21
Total	19	18′	4,227	4,355,519	8,886,490	49	13,301,330	33

The above figures are based on estimated porosity and thickness of the "Seminole Wilcox" sand showing large yield

Table No. 2—Statistical Summary of Seminole

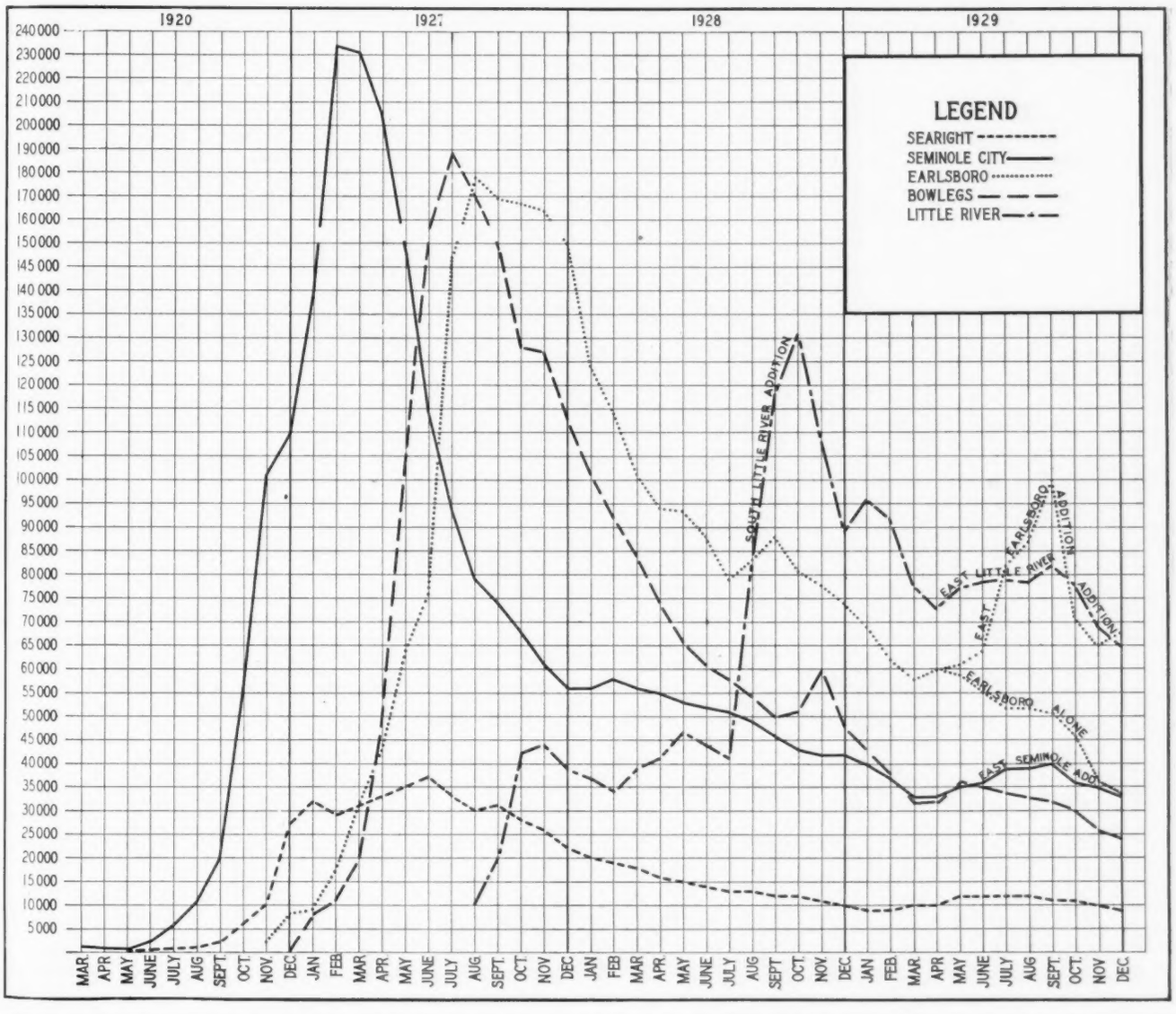
As of Jan. 1, 1930	Little River	Carr City	Maud	Mission	Bowlegs	Earlsboro	Seminole	Searight	St. Louis	Greater Seminole
Age in months	30	20	25	15	37	38	47	46	25	47
Number wells drilled	508	63	163	144	392	589	415	115	495	2,884
Dry holes	73	3	23	33	55	97	59	12	18	373
Plugged producers	30	1	2	2	41	106	70	18	11	281
Present producing wells	405	59	138	109	296	386	286	85	466	2,230
Average initial	4,500	600	550	1,100	2,500	2,500	2,500	1,500	4,500	2,250
Daily average by pool	53,850	7,500	7,950	14,850	24,850	103,200	29,800	8,150	49,350	299,500
Daily average per well	133	127	58	135	84	267	104	96	105	134
Total production	59,418,122	4,213,876	7,272,198	8,900,208	73,355,061	99,158,471	85,111,727	21,891,100	50,101,504	409,422,277
Per acre yield	11,105	6,847	4,461	6,180	18,713	16,834	20,508	19,034	12,141	14,196
No. wells making water	167	15	12	47	124	204	176	49	36	830
Percent of wells making water	41	27	8	42	42	53	61	58	7	37

rels into the tanks. The No. 4 Cowden of the same company in 4-9-5, is another in the million-barrel class, having produced 1,051,000 barrels to Jan. 1 of this year.

One of the few wells in the whole outside of the St. Louis pool, that is obtaining a portion of its production from the second or "true" Wilcox sand is the No. 1 State of the Gypsy Oil Co. in 16-9-5. Like those mentioned above this well had an initial of over 10,000 barrels and its record to date is 1,162,000 barrels.

Contrary to the generally accepted geologic theory, the largest wells of the Earlsboro pool are mostly on the edge and flanks of the structure.

Production Curves of Older Seminole Pools



Production curves for the older pools of Greater Seminole based on daily average, per pool, per month. Figures on the left represent barrels. It must be noted there are breaks in lines running above 150,000 barrels a day and the scale has been changed at that point

Table No. 3—Seminole Producing Wells, as of Jan. 1, 1930, Listed by Company, by Pool

COMPANY	Little River	Carr City	Maud	Mission	Bowlegs	Earlsboro	Seminole	Searight	St. Louis	Total
Amerada	6	1	18	2	6	15	9	4	1	62
Atlantic	..	..	..	..	13	..	3	..	7	23
do Sinclair	..	..	..	..	..	1	..	..	..	1
Barnsdall	7	12	..	..	5	51	12	3	3	93
Blackwell	15	..	..	..	..	..	..	..	5	20
Bryan-Emery	1	..	..	..	..	..	..	..	..	1
Burke-Greis	..	..	..	..	..	2	..	3	..	5
do et al	..	..	..	..	..	3	..	..	..	3
do Red Bank	..	..	..	..	..	3	..	..	..	3
Carter	43	4	..	6	34	22	50	21	2	182
Champlin	3	..	..	..	..	..	..	..	..	3
Continental	10	..	..	4	..	7	..	..	..	21
do et al	5	..	..	..	..	..	..	..	..	5
do Shell	..	..	2	..	..	..	..	..	..	2
Cosden	..	..	..	..	..	3	..	..	..	3
Darby	..	..	..	1	..	..	15	..	10	26
Dixie	..	..	..	..	1	..	..	..	..	1
Empire	6	13	2	..	8	3	3	..	3	38
do Amerada	..	..	..	..	..	2	..	..	..	2
do Continental	..	..	..	..	..	2	..	..	..	2
do Gypsy	..	..	..	..	..	1	..	..	..	1
Gypsy	52	3	15	39	22	45	30	6	31	243
Healdton	..	..	..	..	..	3	..	..	1	4
Home Gas	..	..	..	..	..	..	..	..	1	1
Houston	..	..	..	..	..	..	..	..	5	5
Independent	31	..	4	5	..	6	5	..	26	77
do Atlantic	..	..	..	..	..	1	..	..	..	1
do Darby	..	..	..	..	..	2	..	..	19	21
do et al	1	..	..	..	..	..	..	..	3	4
do Garland	..	..	..	..	..	..	5	..	..	5
Independent-Interocean	..	..	..	..	..	..	4	..	..	4
do Mid-Kansas	..	..	..	..	..	..	..	..	2	2
do Margay	..	..	..	..	..	3	..	..	..	3
do McCullock	..	..	..	..	..	..	3	..	..	3
do Westland	..	..	..	..	..	..	..	..	4	4
do White Eagle	5	..	..	..	..	..	..	..	..	5
Interocean	..	..	..	..	..	..	..	..	7	7
Irwin-Martin	..	..	..	..	..	..	..	..	3	3
I. T. I. O.	29	2	1	..	67	..	23	..	9	131
Kingwood	..	..	..	..	..	..	3	..	..	3
Laurel	..	..	3	..	..	..	..	..	..	3
Magnolia	24	4	8	..	21	64	4	4	131	260
do Pierce	..	..	..	..	..	..	..	..	2	2
McCulloch	..	..	..	..	1	..	..	..	..	1
do et al	..	..	..	..	..	..	..	..	11	11
do Sands	1	..	..	..	..	..	..	..	..	1
McMahon	..	..	..	2	..	..	..	..	..	2
McMann	..	..	1	..	..	..	..	..	..	1
Mid-Continent	23	..	3	1	10	9	14	13	3	76
Mid-Kansas	..	..	..	1	..	1	..	..	7	9
Minnehoma	..	..	..	4	1	4	..	..	3	12
Packard	..	..	..	..	..	..	..	..	2	2
Panther	..	..	..	..	..	..	..	..	2	2
Papoose	..	..	..	..	..	..	..	1	..	1
Phillips	..	..	5	..	..	4	2	..	8	19
Pine	8	..	4	4	..	..	..	1	..	17
do Phillips	1	..	..	..	..	..	..	..	..	1
Prairie	43	11	10	10	23	39	28	7	51	222
P. & R.	10	..	..	..	..	2	..	..	..	12
Pure	19	..	14	..	25	..	22	3	9	92
Reiter-Foster	3	..	..	..	..	..	..	..	..	3
Shaffer	3	..	..	3	3	2	..	..	8	19
Shell	11	..	4	..	5	9	3	5	4	41
do Continental	..	..	..	3	..	..	..	..	..	3
do Papoose	..	..	..	8	..	..	..	..	..	8
Sinclair	16	9	16	5	30	10	18	4	51	159
Skelly	2	..	4	..	..	14	..	..	2	22
do Lenox	..	..	1	..	..	..	..	..	..	1
Slick-White Eagle	..	..	..	..	..	..	..	..	3	3
Snowden-McSweeney	2	..	..	..	..	..	..	..	..	2
Superior	1	..	..	..	..	7	5	1	3	17
Texas	21	..	9	..	11	31	3	1	6	84
Tidal	2	..	4	5	10	9	15	..	1	46
Turman	..	..	..	..	..	..	7	..	1	8
Twin State	1	..	2	6	..	6	..	2	..	17
Warner-Quinlan	..	..	..	..	..	..	..	..	1	1
Westheimer-Daube	..	..	..	..	..	..	..	..	7	7
do Gypsy	..	..	..	..	..	..	..	..	5	5
Wilcox	..	..	8	..	..	..	..	6	..	14
Wyatt	..	..	..	..	..	..	..	..	1	1
Total	405	59	138	109	296	386	286	85	466	2230

Seminole City is a little more orthodox and had its major producers on the top where the text books say they ought to be. A conclusion might be drawn on the basis of this information that the Earlsboro pool will go to water sooner and faster than the Seminole pool. However, a study of the comparative statistics in table No. 2 fails to support any such reasoning. The accounts seem to be fairly even at the present time. Earlsboro seems to be a case of intermediate oil accumulations with water in between the local highs, while Seminole City has more of the usual edge water drive. Later on, it is reasonable to suppose that the former will decline faster as a direct result of water.

There is no question about the seriousness of the water situation in the Greater Seminole area. Out of a total of 2230, the present number of producing wells, 830, or 37 per cent, are making water. In many other fields these figures would not have as great a significance as in the area under discussion. But since the number of water wells at Seminole has shown such a rapid increase and 281 former producers owe their abandonment largely to water, there seems reason to believe that ultimate production curves will be cut short of their present projections.

The curves shown herewith represent the daily average by pool by month of the largest and oldest of the Seminole area pools. Because of the several proration programs that have changed the normal trend of the decline, it has been found rather difficult to plot the future production. For the same reason and as a result of gas lift, the curves show a broken and delayed decline. Yet the data at the end of the four-year period are sufficient to make a fairly logical estimate as to what the future holds.

The similarity of curves for the three larger pools, Seminole, Bowlegs and Earlsboro, is striking. Without any further additions they would probably finish up about the same time even though their starting dates are scattered over a year. In the case of Seminole City, disregarding the addition of the East Seminole addition, a projection of the curve indicates that it will reach a per well average of 40 barrels in a little over four years. This figure is based on the erratic decline of its present curve.

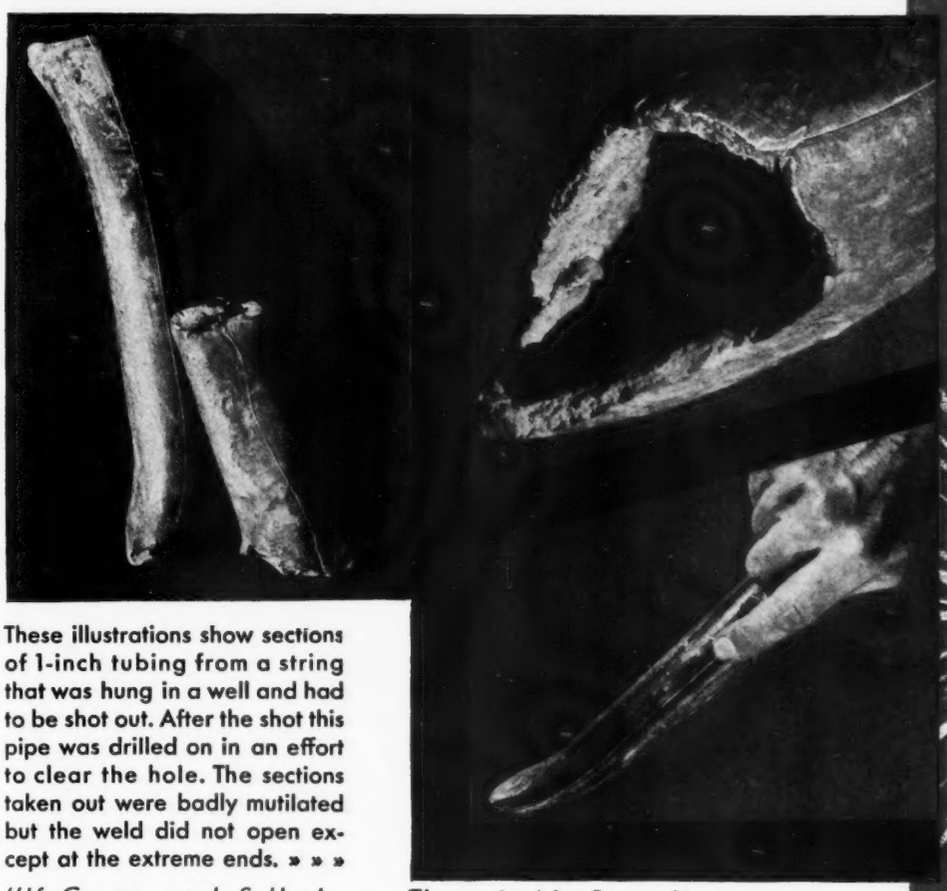
If this figure is correct, it implies that the Seminole City pool is approximately 80 per cent depleted at the present time. To the 85,111,727 barrels it has already produced may be added 21,280,000 barrels for an estimated ultimate recovery of a little over 106,000,000 barrels. Considering the record of the past year with regard to wells plugged and water incursion, the estimate of depletion seems fairly conservative.

Earlsboro would not be far behind

DYNAMITED!

but the weld did not open

ANOTHER PROOF THAT YOUNGSTOWN PIPE IS GOOD PIPE



These illustrations show sections of 1-inch tubing from a string that was hung in a well and had to be shot out. After the shot this pipe was drilled on in an effort to clear the hole. The sections taken out were badly mutilated but the weld did not open except at the extreme ends. » » »

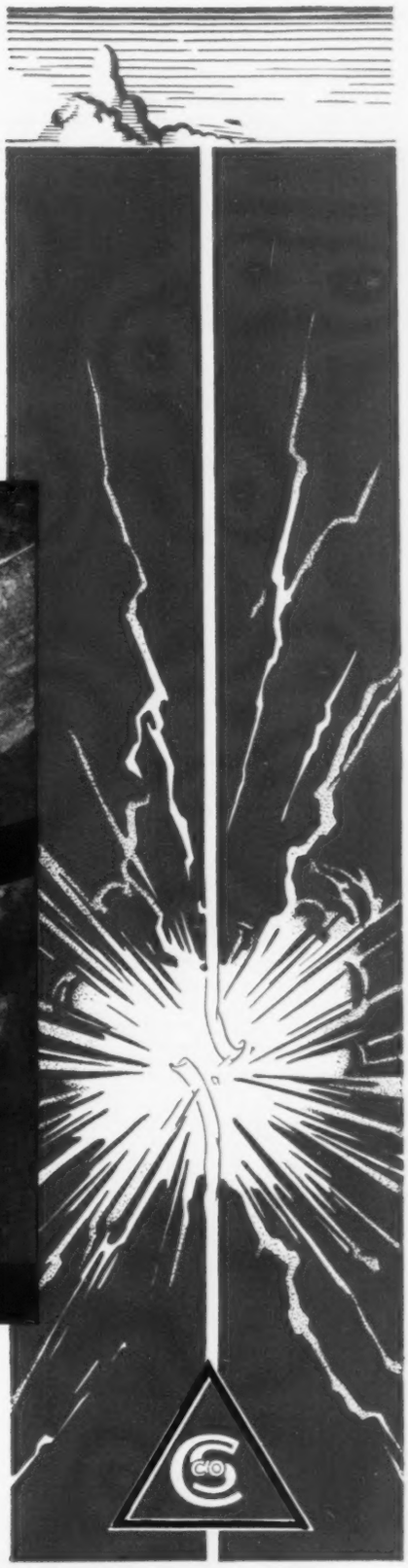


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Table No. 4—Total Seminole Production by Company and by Pool

The figures given in this table are as of Jan. 1, 1930, showing the rank of each company and the per cent of its total production with reference to the total for the district. Wherever possible the figures given were taken from pipeline runs. In the case of several joint interests and purchased properties the present operating company has been credited with the production

Rank	Company	Little River	Carr City	Maud	Mission	Bowlegs	Earlsboro	Seminole	Searight	St. Louis	Total Production	Percent of Total
9	Amerada	1,555,021	4,681	1,268,992	248,931	3,027,146	5,674,434	4,054,759	782,160	2,717	16,618,841	4.06
19	Atlantic	.....	.....	.....	.....	2,547,866	.....	923,263	.....	256,963	3,728,092	.91
87	do Gypsy	.....	.....	.....	.....	.....	1,108	.....	.....	.....	1,108	.0001
70	do Sinclair	.....	.....	.....	.....	.....	85,067	.....	.....	.....	85,067	.024
8	Barnsdall	767,583	1,075,516	.....	.....	682,017	14,400,155	4,940,648	17,053	424,446	22,307,418	5.45
24	Blackwell	2,901,872	.....	.....	.....	.....	.....	.....	.....	286,300	3,188,172	.77
83	Bryan-Emery	7,512	.....	.....	.....	.....	.....	.....	.....	.....	7,512	.0014
54	Burke-Greis	.....	.....	.....	.....	.....	305,604	.....	.....	.....	305,604	.07
63	do et al	.....	.....	.....	.....	.....	.....	.....	132,223	.....	132,223	.32
42	do Red Bank	.....	.....	.....	.....	.....	671,657	.....	.....	.....	671,657	.16
1	Carter	6,958,602	629,720	.....	557,239	8,967,533	3,653,916	16,187,730	7,062,617	6,486	44,023,843	10.75
43	Champlin	599,580	.....	.....	.....	.....	.....	.....	.....	.....	599,580	.14
20	Continental	1,579,873	.....	.....	339,315	.....	1,784,356	.....	.....	.....	3,703,544	.94
55	do et al	299,491	.....	.....	.....	.....	.....	.....	.....	.....	299,491	.073
75	do Shell	.....	.....	42,613	.....	.....	.....	.....	.....	.....	42,613	.01
48	Cosden	.....	.....	.....	.....	.....	483,854	.....	.....	.....	483,854	.11
39	Crosbie	.....	.....	.....	.....	.....	936,568	.....	.....	.....	936,568	.23
51	Darby	.....	.....	21,014	22,676	.....	.....	.....	.....	283,767	327,457	.08
77	Dixie	.....	.....	.....	.....	40,567	.....	.....	.....	.....	40,567	.01
15	Empire	399,705	1,031,577	196,731	.....	1,644,382	1,383,223	895,416	.....	.....	5,551,034	1.4
45	do Amerada	.....	.....	.....	.....	.....	408,711	.....	.....	131,078	539,789	.13
66	do Continental	.....	.....	.....	.....	.....	110,383	.....	.....	.....	110,383	.027
85	do Gypsy	.....	.....	.....	.....	.....	3,509	.....	.....	.....	3,509	.0008
2	Gypsy	6,683,596	212,570	691,861	2,771,762	4,536,248	15,526,822	5,566,899	864,144	4,405,049	41,258,951	10.03
82	Healdton	.....	.....	.....	.....	.....	.....	.....	.....	8,136	8,136	.0019
71	Home Gas	.....	.....	.....	.....	.....	.....	.....	.....	84,351	84,351	.02
61	Houston	.....	.....	.....	.....	.....	.....	.....	.....	206,552	206,552	.048
11	Independent	3,378,299	.....	402,978	955,539	.....	793,989	1,578,452	.....	7,192,742	14,301,199	3.46
18	do Atlantic	.....	.....	.....	.....	.....	4,028,918	.....	.....	.....	4,028,918	.97
25	do Darby	.....	.....	.....	.....	.....	1,867,921	.....	.....	1,120,933	2,988,854	.73
47	Independent et al	2,951	.....	.....	.....	.....	.....	.....	.....	485,610	488,561	.12
27	do Garland	.....	.....	.....	.....	.....	.....	2,264,673	.....	.....	2,264,673	.55
67	do Interocean	.....	.....	.....	.....	.....	.....	99,106	.....	.....	99,106	.024
69	do Mid-Kansas	.....	.....	.....	.....	.....	.....	.....	.....	91,876	91,876	.022
28	do Margay	.....	.....	.....	.....	.....	2,123,415	.....	.....	.....	2,123,415	.51
76	do Continental	.....	.....	.....	.....	41,478	.....	.....	.....	.....	41,478	.01
33	do McCullock	.....	.....	.....	.....	.....	.....	1,373,518	.....	.....	1,373,518	.33
56	do Westland	.....	.....	.....	.....	.....	.....	.....	.....	290,103	290,103	.071
38	do White Eagle	939,162	.....	.....	.....	.....	.....	.....	.....	.....	939,162	.23
52	Interocean	.....	.....	.....	.....	.....	41,478	.....	.....	272,285	313,763	.076
58	Irwin-Martin	.....	.....	.....	.....	.....	.....	.....	.....	259,813	259,813	.063
4	I. T. I. O.	7,074,727	28,471	20,002	.....	17,318,512	.....	5,753,674	.....	142,381	30,337,767	7.4
34	Kingwood	.....	.....	.....	.....	.....	.....	1,204,760	.....	.....	1,204,760	.29
68	Laurel	.....	.....	93,014	.....	.....	.....	.....	.....	.....	93,014	.023
6	Magnolia	1,816,445	102,264	91,860	.....	2,496,542	11,829,714	957,887	207,382	9,694,747	27,196,841	6.63
62	do Pierce	.....	.....	.....	.....	.....	.....	.....	.....	198,540	198,540	.048
57	McCulloch	.....	.....	.....	.....	263,436	.....	.....	.....	.....	263,436	.064
36	do et al	.....	.....	.....	.....	.....	.....	.....	.....	972,536	972,536	.237
84	do Sands	5,614	.....	.....	.....	.....	.....	.....	.....	.....	5,614	.0013
59	McMahon	.....	.....	.....	228,161	.....	.....	.....	.....	.....	228,161	.056
78	McMann	.....	.....	35,867	.....	.....	.....	.....	.....	.....	35,867	.009
10	Mid-Continent	4,701,259	.....	114,049	30,317	1,929,505	1,687,185	2,638,942	3,286,359	217,083	14,604,699	3.56
32	Mid-Kansas	.....	.....	.....	18,929	.....	143,900	251,077	.....	1,026,248	1,440,154	.35
35	Minnehoma	.....	.....	.....	189,736	532,804	245,614	.....	.....	57,029	1,025,183	.25
64	Packard	.....	.....	.....	.....	.....	.....	.....	.....	130,363	130,363	.032
74	Panther	.....	.....	.....	.....	.....	.....	.....	.....	49,428	49,428	.012
72	Papoose	.....	.....	.....	.....	.....	.....	.....	65,062	.....	65,062	.016
31	Phillips	.....	.....	154,611	.....	.....	661,841	187,076	.....	708,641	1,712,169	.42
65	Philmack-Continental	.....	.....	.....	.....	.....	113,304	.....	.....	.....	113,304	.028
26	Pine	962,951	.....	1,290,435	255,462	.....	.....	.....	.....	16,873	2,525,721	.615
53	do Phillips	305,986	.....	.....	.....	.....	.....	.....	.....	.....	305,986	.075
3	Prairie	5,276,774	663,417	287,028	676,980	6,529,486	9,327,885	4,082,003	2,275,643	5,585,519	34,714,735	8.5
37	P. & R.	962,435	.....	.....	.....	.....	6,540	.....	.....	.....	968,975	.236
7	Pure	2,959,603	.....	502,187	154	6,877,802	.....	9,626,964	2,097,276	3,217,143	25,681,129	6.26
40	Reiter-Foster	706,190	.....	.....	.....	.....	.....	.....	.....	.....	706,190	.17
44	Searight	.....	.....	.....	.....	.....	.....	.....	540,479	.....	540,479	.132
29	Shaffer	96,211	.....	.....	322,918	559,003	508,738	.....	.....	541,786	2,028,656	.495
6	Shell	1,408,644	.....	130,357	.....	735,870	1,598,013	399,653	843,559	127,000	5,243,096	1.27
60	do Continental	.....	.....	.....	206,745	.....	.....	.....	.....	.....	206,745	.05
49	do Papoose	.....	.....	.....	403,677	.....	.....	.....	.....	.....	403,677	.098
5	Sinclair	2,793,697	465,600	591,553	378,110	10,105,403	2,791,879	6,231,492	1,742,025	4,540,320	29,640,139	7.25
17	Skelly	735,037	.....	194,896	.....	.....	3,820,933	.....	.....	107,549	4,858,415	1.12
79	do Lenox	.....	.....	32,773	.....	.....	.....	.....	.....	.....	32,773	.008
14	Slick	501,758	.....	.....	3,748	59,616	527,613	4,982,474	.....	4,523,772	10,598,981	2.57
73	Slick-White Eagle	.....	.....	2,220	.....	.....	.....	.....	.....	54,770	56,990	.014
46	Snowden-McSweeney	494,518	.....	.....	.....	.....	.....	.....	.....	.....	494,518	.121

Table No. 4—(Continued)

Rank	Company	Little River	Carr City	Maud	Mission	Bowlegs	Earlsboro	Seminole	Searight	St. Louis	Total Production	Percent of Total
86	Sunray Cal-Cul	.....	.....	1,795	.....	.....	.....	.....	.....	.....	1,795	.0004
88	Sunray-Larkin	.....	.....	.....	.....	.....	.....	.....	889	.....	889	.0002
21	Superior	10,739	.....	.....	.....	.....	1,911,149	1,623,650	24,737	49,803	3,620,078	.89
13	Texas	1,868,347	.....	118,621	.....	2,367,502	4,734,476	340,586	19,298	1,205,429	10,654,259	2.58
12	Tidal	600,843	.....	147,235	451,152	1,915,729	3,189,738	5,691,310	.....	41,010	12,037,017	2.94
23	Turman	.....	.....	.....	.....	.....	.....	3,255,715	.....	.....	3,255,715	.795
22	Twin State	53,097	.....	53,568	838,627	176,614	1,774,861	.....	390,481	.....	3,287,248	.805
81	Warner & Quinlan	.....	.....	.....	.....	.....	.....	.....	.....	8,682	8,682	.0021
41	Westheimer-Daube	.....	.....	.....	.....	.....	.....	.....	.....	692,027	692,027	.17
50	do Gypsy	.....	.....	.....	.....	.....	.....	.....	.....	387,983	387,983	.095
30	Wilcox	.....	.....	385,938	.....	.....	.....	.....	1,522,850	.....	1,908,788	.48
80	Wyatt	.....	.....	.....	.....	.....	.....	.....	.....	12,508	12,508	.003
	Totals	59,418,122	4,213,876	7,272,198	8,900,208	73,355,061	99,158,471	85,111,727	21,891,110	50,101,504	409,422,277	

were it not for the addition of its eastern extension, for the dive it took in the latter part of 1929 was not entirely due to proration. Bowlegs is already paralleling the decline of Seminole City and it ranks high in the water column.

To say that the whole Seminole area is 80 per cent depleted would be to overlook the fact that many new and good wells are being brought in. Their initials are not as large as some of the older wells but they all help to prolong the life of the district. In all probability other pools will be found which, with the extensions of the past two years, may connect all of the pools in one huge field. Meanwhile, the older units are showing their age.

In view of the large recoveries in the Greater Seminole field a natural conclusion is that most anyone operating in the area should have made plenty of money. Operating costs do not bear out the theory however. An average taken from the statistics furnished by five major operators shows that the cost of drilling and completely equipping a producing well in this district, including air lift, was about $92,000. Dry holes are somewhat cheaper at $66,000.

Assuming that four producers were drilled on a "40" and resulted in a recovery of 20,000 barrels to the acre, the cost of drilling, plus land and incidentals, was approximately $375,000. From the gross production of 80,000 barrels must be subtracted the one-eighth share of the royalty owner, leaving the producer a net of 700,000 barrels. Insurance, taxes, overhead, etc., may be conservatively estimated at 46 cents per barrel. This figure, the lifting cost, when applied to only the net oil brings the development cost of the lease to a total of $697,000.

From this total may be subtracted a doubtful salvage value of $70,000 which makes the net cost to the operator of $627,000. At an average price of $1.40 per barrel over the whole period it looks as if the operator had made a nice profit. In some cases that was true, but it requires a little more than the average luck and all the breaks where the dry holes were concerned. Despite the fact that Greater Seminole has made some impressive recovery records, there are any number of producers who are not "pointing with pride" to their financial returns.

New Equipment

The Foxboro Co., Foxboro, Mass., recently placed on the market a new high pressure flow meter guaranteed to withstand working pressures of 5000 pounds per square inch, for measuring gas, air, steam, hot oil, and gasoline. It is calibrated to read in terms of flow, and may be equipped with an integrator that reads direct in terms of total flow in gallons or feet or pounds. All parts subjected to high pressure are made of drop forgings, extra heavy rugged construction; other features are similar to those employed in other Foxboro instruments for similar purposes.

* * *

The Compressed Air Society, 90 West St., New York, has just published the fourth edition of Trade Standards. In addition to the previously published standards of the society the pamphlet contains a new formula for use in air compressor testing which is accurate for higher water columns than that previously used; additional suggestions regarding the installation and operatioin of compressors, and cautions against the use of old boilers or tanks for air receivers.

An illustration of a new air cleaning device is also found in the pamphlet, and practical suggestions for the handling of very cold cooling water to avoid undue condensation, and wear on air cylinders. Copies of the publication may be obtained from the New York office at a price of 50 cents.

* * *

The Service Station Equipment Co., 4435 S. Western Blvd., Chicago, is making a 10-inch wide, 60-gallon capacity High-Boy for dispensing oil. One of the outstanding features of this device is that it saves space, inasmuch as 10 different grades of oil in 60-gallon quantities of each, can be dispensed in the same amount of space previously required for seven grades of oil. It requires four-fifths of the floor area required by the wider unit formerly made.

The new unit has a patented multiple-truss construction consisting of 10-angle beam internal transverse braces electrically welded at all points and to both sides of the tank.

In actual service, the company says, this unit has demonstrated that it is of the right height and depth for easiest pumping on the part of the station attendant.

* * *

The J. H. Williams Co., Buffalo, N. Y., recently introduced a new "Vulcan Superior" Chain Tongs, equipped with reversible pipe and fittings-jaws, permitting the tongs to be used on either pipe or fittings with equal facility without altering the tool for either purpose. When teeth first used show wear, the jaws may be turned end-for-end, doubling the life of the jaws. It is furnished with either flat or cable type chains, and all parts are interchangeable.

* * *

The Troy Engine and Machine Co., St. Joseph, Mich., has just issued Bulletin No. 106, describing the construction and operation of Engberg direct current generating sets in sizes from 3½ to 60 K. W. These units are steam driven, direct connected. The bulletin describes in detail with many photographs and drawings, the design of the various parts of the units, including armature and coil windings, crankshaft, piston and rods and flywheel governor. The advantages claimed for these units include compactness, low steam consumption, lubrication economy, low upkeep cost, and close regulation by a properly designed governor.

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Modern Refining—Science and Practice

By Colonel George A Burrell*

Article 12

The Cracking Process; Vapor and Liquid Phase Processes; Hydrogenation

DIFFERENT refiners prefer to operate cracking units of the same design in different ways, even in the same territory and using the same type of charging stock. Thus, in the Mid-Continent district one will find them operating Dubbs units on fuel oil by the non-residuum method whereby a considerable amount of coke is produced, say 25 pounds per barrel of raw oil, and where the units are on stream several days; by the residuum method whereby less coke and more residuum are made, or by the low level method, whereby a negligible quantity of coke is made and a large amount of residuum, say 35 per cent of the latter, based on the raw oil. Gasoline yields vary from 40-45 per cent up to 60 per cent or more.

The reasons are largely of a marketing nature. One refinery in cracking residuum stocks may have developed a good market for coke and reduced the cleanout period to a relatively short time, and prefers a high gasoline yield, which is concurrent with the non-residuum method of operation. Another may have developed but little market for coke, but a good one for residuum, and may prefer the low level method where units are on stream for three weeks, and residuum yields are large, and coke production low, although gasoline yields are somewhat reduced.

Charging Stocks

Gas oil was first cracked commercially to make gas, as were residue stocks to some extent. Burton's charging stock was gas oil. His shell stills could not make a satisfactory commercial yield out of residues without getting hot bottoms. Cross used gas oil and kerosene distillate, Holmes-Manly and the Standard Oil Co. of New Jersey (tank and tube process) also used light oils, Dubbs concentrated, in the main on residuum stocks. More recently other systems crack them.

Gas oil from a Pennsylvania crude is paraffinic and naphthenic and but little coke is made, but the coke that is produced is dense and hard and sticks relatively tightly to tubes and reaction chambers. Coke from Gulf Coast gas oil forms in larger quantity, but is softer and more friable. The same distinction has been noted in coke deposited on pistons and cylinders of gasoline engines when Pennsylvania and Gulf Coast lubricating oils have been used. California oils (from California heavy oil) aromatic in character are the most troublesome as coke formers in a cracking system.

Apart from the question of composition of stock, its volatility is important. The lighter the stock the more pressure required to keep it in the liquid phase, or largely in the liquid phase, and in the cracking zone longer, and thus get the benefits of liquid phase cracking. For this reason some units go to very high pressures to crack light stocks. Lower pressure will crack them but more refluxing is needed and hence plant capacities go down. Fuel consumption and treating costs are higher.

The more naphthenic and aromatic the charging stock the more anti-knock the gasoline[1]. Thus one finds gasoline of high anti-knock value made from select charging stocks like Smackover, some West Texas oils, California oils, Gulf Coast oils, like Spindle Top oil, and others.

Yields

The facts about high gasoline yields from laboratory tests or from special large scale tests is now pretty well understood. It means nothing to say that a high yield of gasoline is obtained unless throughputs, economy and other factors are known. The refiner wants the most and best gasoline per year from his investment and operating cost, and this is the only basis on which yields can be discussed. Yields today range from 25 to as high as 70 per cent in commercial units, probably higher in some special cases.

Vapor and Liquid Phase Processes

Burton worked in the so-called liquid phase. Rittman, Hall, DeFlorez, Alexander and others built vapor phase plants during the war. After the war they could not compete with liquid phase processes. Now a few vapor phase plants are being built again to make anti-knock motor fuel, notably the DeFlorez and Gyro plants, and some by the Sinclair Refining Co., Skelly Oil Co. and others.

Years of cracking plant experience is incorporated in them, such as better furnaces, better temperature control, better reflux towers, etc., so that they operate more economically than formerly. Even so gas and treating losses are still high, but a premium gasoline is made, and a gasoline in demand.

The difference in the economical working of liquid and vapor phase processes, to the advantage of the former, lies in the fact that overcracking takes place in vapor phase systems. Too much gas is made, and fuel consumption and treating costs are high. The reaction rate is terrifically high at 1050-1100 F., and cannot be controlled as well as it can at 750-950 F. It is further more difficult to economically heat a mass of oil in the vapor phase than the same mass in the liquid phase. In the more concentrated condition the heat can be more efficiently applied.

Of course, as one increases the pressure on vapor phase cracking units, the gas molecules may be so closely packed together that the benefits of liquid phase cracking materialize[2] to some extent. The fact of the matter is one does not know where to draw the line between so-called liquid and vapor phase processes.

In earlier days when the Burton type of process of moderate temperature and pressure represented one type

[1]Except as the temperature is raised so high that end products tend to approach the same value regardless of the charging stock.

[2]Thus De Florez prefers to operate at 80 lbs. per square inch.

of unit, the liquid phase type, and the Rittman-Hall-Alexander type of high temperature process represented the vapor phase type, the distinction was clearer, but today the modern cracking process typified by the Dubbs, Holmes-Manley and Cross type have raised their temperatures from say 800 F. of some years ago, in some cases to those of 950-1000 F., and the modern vapor phase type has come down from 1100-1200 F. to 1050-1150 F.

In each case so much of the oil is in the vapor phase that both types could be called vapor phase types. The higher the pressure the more closely are the molecules packed together and the more gas goes into solution in the liquid. But to the extent that modern vapor phase systems operate at somewhat higher temperatures and lower pressures than the other types they still retain the name of vapor phase systems.

A large amount of gasoline is recovered from the gases in low pressure vapor phase processes; and as much as 20 per cent of the total in some cases of low pressure operation whereas high pressures in the receivers strip the gas more cleanly of gasoline. Vapor recovery plants were not built on older vapor phase processes; or were built inefficiently. Added income can be secured by selling the gas to cities for domestic and industrial use, but a refinery has to be suitably located to do this. Gas from liquid phase processes is also sold in some instance.

Alcohols and glycols can be made from the olefins present, but alcohol manufacture is to some extent at least tied up by the Standard Oil Co. of New Jersey, and glycol manufacture by the Carbide & Carbons Chemicals Co. Of course systematic trained research can develop independent methods, but a large staff of competent research workers is usually required for this kind of development work.

Hydrocarbon gases may also be converted to liquid products, in which aromatics predominate, by heat and pressure, with or without catalysts, the silent discharge, ultra violet light, etc., but temperatures of the order of 700-900 C. are required. The processes are scarcely commercial as yet, although this line of attack is promising. This subject has been discussed in preceding pages.

Composition of Cracked Gasoline

We more or less guess at the composition of cracked gasoline. Sulfuric acid absorption, aromatic nitration, aniline point methods, specific gravity, index of refraction, and fractionation, all have been invoked to learn something about the matter.

Egloff and Morrell[3] give the following analyses of some liquid phase cracked gasoline from the Dubbs process, made at about 840 F.

	I Per cent	II Per cent	III Per cent
Hydrocarbons			
Unsaturates	10.9	12.5	16.0
Aromatics	19.8	14.9	18.6
Naphthenes	18.0	11.8	11.7
Paraffins	51.3	60.8	53.7

The analyses will vary with the charging stock and extent of cracking. Further, they are decidedly approximate.

Brame and Hunter's[4] work on a Cross cracked gasoline showed:

Paraffins: Normal paraffins and iso-paraffins, hexane, heptane, isohexanes, trimethyl-ethyl-methane and diisopropyl, and indications of pentane, iso-pentane and isoheptanes.

Olefins: These were the predominating unsaturates. Three and two-methyl pentane and four-and five-methyl hexane were probably present.

Diolefins: Indications of diolefins were found.

Cyclic Olefins: Hydrocarbons of this class predominated among the unsaturates boiling from 90-120 C.

Aromatics: Small percentages of aromatics were present, probably benzene and toluene.

Probably the earliest exhaustive study of the products of the pressure cracking of oil was that undertaken by Carl Schneider[5] of Ludwig University, at Giessen, Germany, in 1888. The work compares favorably with the best done today. Residual oil from distillation of pressure tar was cracked at 3 to 6 atmospheres and 400 to 500 C., and the pressure distillate was examined to identify the compounds.

Hydrogen sulfide gas was identified by testing with lead acetate paper. Paraffins were identified by fractional distillation, by removing unsaturates with sulfuric acid and bromine, then distilling the oil to concentrate the fractions into those corresponding to the paraffins. The products were identified by the specific gravity, the refractive index, and by determining the vapor pressures, molecular weights and carbon and hydrogen content of the purified and distilled oils. Pentane, hexane, heptane and nonane were identified. The paraffins amounted to 55 to 60 per cent of the pressure distillate, and were mainly normal ones.

Olefins were identified by adding bromine from which the vapor density and the per cent of olefins were calculated. The olefin content of the fraction 35-40 C. was found to be about 44 per cent, that of the 67-70 C. fraction was 41 per cent, and that of the 96-99 C., fraction was 43 per cent.

Aromatic hydrocarbons were noted by Gustavson's method which consists in mixing the oil with aluminum bromide, forming a double aluminum compound, which upon evaporation forms characteristic needles. In addition the fraction 75-90 C. was nitrated to form nitrobenzene. Mesitylene and pseudocumol were identified by adding iodine to the 160-190 C. oil fraction to form iodides of the olefins which were distilled off. The residual product was then nitrated to form a characteristic crystalline mass, which was crystallized several times from pure alcohol to form crystals of melting point 166-167 C. From the boiling point of the original fraction and the melting point of the crystals it was assumed that mesitylene and pseudocumene were present in the oil.

Naphthenes were identified by removing the other compounds and determining the specific gravity and refractive index of the residual oils. Phenols (C_6H_5OH) were identified in the fraction 180-185 C., by shaking with caustic soda solution; a dark phenol-sodium layer appeared which was removed by means of a separatory funnel. Upon adding acid the phenol was recognized by its odor. Sulfur in the form of mercaptans and thiophenol like compounds were indicated.

Controlling the Cracking Reactions

The cracking reaction has always been controlled to a certain extent. In earlier days tremendous amounts of oil were cracked to make kerosene at atmospheric pressure, by means of plenty of refluxing, moderate temperatures, and over a long time. There was not much demand for lubricants, hence these, to a considerable extent, were cracked to make kerosene. Later the cracking reaction was more or less stopped short of cracking too much of these lubricating fractions. This was done, and still is, to a certain extent, in so-called tower stills. Re-

The accompanying article completes Colonel Burrell's discussion of the cracking process. Succeeding articles will take up other phases of refining.

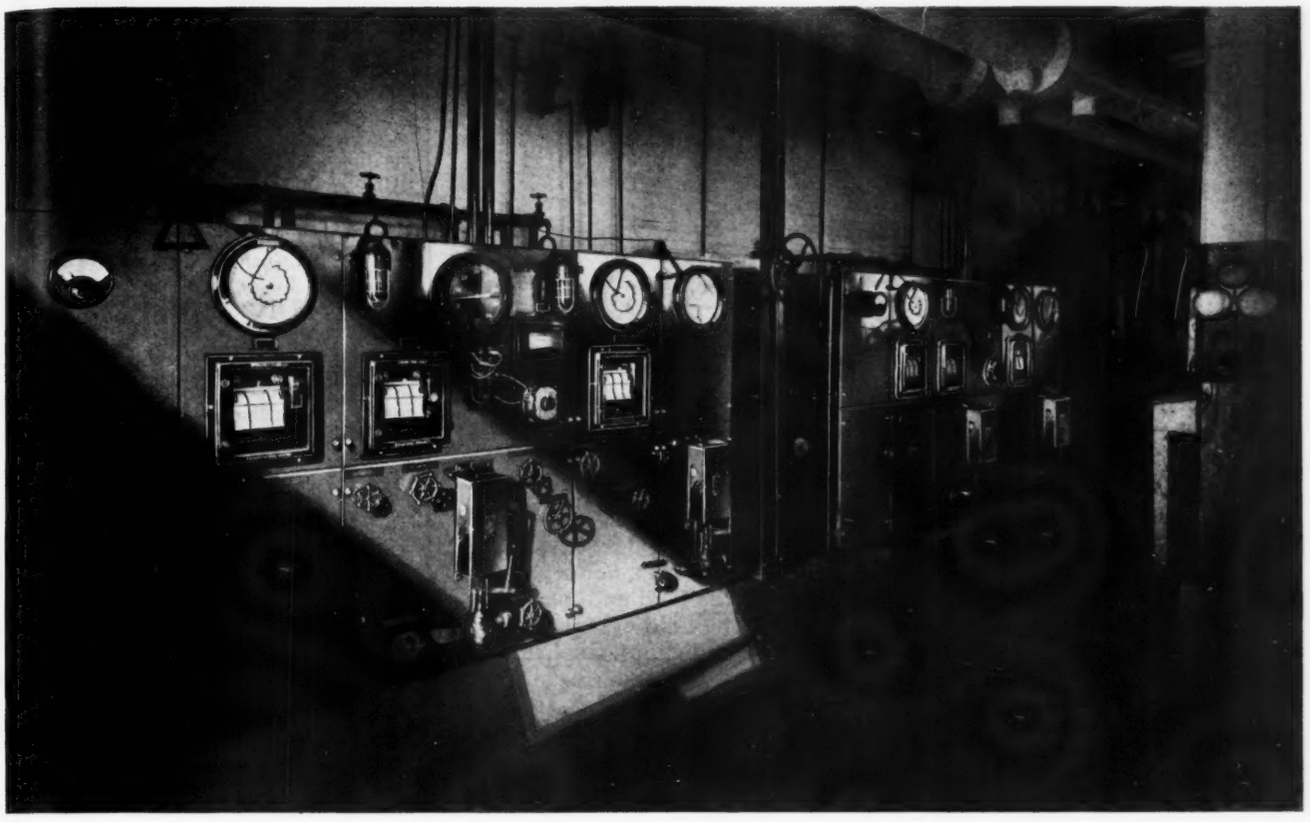
Article 13 which will be published in the March 19 issue will discuss the technology of treating light distillates. The action of sulfuric acid, the sweetening reaction, the action of caustic soda, the action of sodium and calcium hypochlorite and the use of other reagents will be explained in this article.

Description will be given of apparatus for fractionating and stabilizing a part of the pressure distillate which need not be acid treated.

[3]Ind. Eng. Chem. 18, 4, 1926, p.354.

[4]Jour. Inst. Pet. Tech., Dec. 1927, p.794.

[5]Investigations of the low boiling products which are obtained through dry distillation of heavy Saxon lignite tar at pressures of 3 to 6 atmospheres. Inaugural dissertation for the degree of doctor of science at Ludwig University, 1888.



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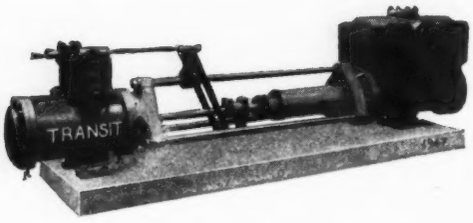

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fluxing was early practiced to re-crack a large amount of distillate, and still is practiced as an essential part of the cracking reaction.

Burton used temperatures of about 750 F. and pressures of about 6 atmospheres, and a shell still, gas oil as a charging stock, and could only take off about 55 per cent pressure distillate before hot bottom trouble became imminent. The definite limitations on his operations were coke deposits. Temperatures and pressures were carefully controlled to avoid coke as much as possible.

As the process proceeded temperatures were raised somewhat, for the same pressure, to keep the same amount of pressure distillate coming over per hour. This was necessary because the longer the oil stayed in the cracking zone the less prolific it became as a source of gasoline. After sporadic vapor phase attempts during the war the tube still came into its own as a cracking medium and has proceeded to the present modern cracking systems.

Up to comparatively recent times the reaction chamber was largely a place for carbon deposition. The tubes were the heating medium and the reaction chamber a place where the oil stewed and the reaction completed itself and where coke was deposited. Cracking meant coke, and a place had to be provided for this troublesome material.

The reaction chamber has now lost its earlier importance as a depository for coke. In some operations this material is not made in anything like the quantity that once was the case. Cracking still takes place in the tubes and in the reaction chamber but in some operations instead of allowing so much to occur in the latter place the oil is rapidly withdrawn. An insignificant amount of coke is made and also more residuum, for the same throughput and other comparable conditions.

The coking reaction predominates if the oil is allowed to remain too long in the reaction chamber. Thus the coking part of the reaction can, to a considerable extent, be controlled. However, as already stated, some refiners prefer to run by other methods, more coke and less residuum, for reasons already given. It should be mentioned that some units have dispensed with the reaction chamber in that the hot oil goes direct to a dephlegmator (reflux tower) where the pressure is reduced.

Coke still acts as a bar to continuity of operation even when little of it is made. It deposits in tubes and units have to be shut down to remove it. Sometimes pump or other trouble develops ahead of coke trouble.

The possibilities along the line of reaction control are alluring. Cracking is such a complex reaction that the products can only be controlled at the present time in groups; for

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instance, decrease of coke, as mentioned above, or the production of considerable unsaturates and aromatics by high temperatures, absence of unsaturates by means of the aluminum chloride method, or hydrogenation of them, such as the Standard Oil Co. of New Jersey intend to do in their new hydrogenation units.

Certain compounds are badly wanted in cracked gasoline, but a penalty is paid for them if they are to be secured in quantity. For instance, olefins in vapor phase products, or more aromatics at still higher temperatures. Of the paraffins the normal ones apparently knock more than the branched chain ones, and one of them, Edgar's synthetic octane, is an anti-knocker. The aromatics are desirable as are the naphthenes.

High temperatures are needed to make aromatics in quantity, and pressure decreases olefins. The problem is to make a quantity of the most desirable ones. This can be done now to a certain extent, as already discussed. A proper selection of charging stocks helps and judicious selection of time, temperature, reflux and pressure. Catalysts have long been used to divert reactions along certain channels and lower the energy input required for a given reaction. They will be used more in the future in the cracking reaction.

There is need of more exact work on the anti-knock properties of the different cracked hydrocarbons so that as time goes on cracking operations can be pointed to produce them. At any rate the olefins are highly desirable, as are the aromatics and naphthenes. For this reason vapor phase cracking units are again in some demand.

Hydrogenation cracking units will make naphthenes and aromatics at the expense of unsaturates, and naphthenes from aromatics. The operation may develop into an economical one from the standpoint of cost. However, at the moment it looks as though the exceedingly high pressure necessary to force hydrogen into the oil (3000 lbs. upwards) would partly act as a bar to extensive hydrogenation operations. But one can never tell what the morrow may bring forth.

Hydrogenation

A tremendous amount of experimental work and some commercial work has been done on the hydrogenation of coal and oil and their products. The hydrogenation of fats to make soaps and edible products has long been a huge industry and the hydrogenation of carbon monoxide to make methyl alcohol is a commercial process.

In the hydrogenation of coal and oil the hydrogen fixes itself to unsaturated groups and the formation of tars and coke is prevented; saturated light bodies are found, including motor fuel.

Tars and coke are unsaturated bodies rich in carbon and poor in hydrogen. Adding hydrogen corrects this deficiency. Another result is that sulfur in the original charge largely passes off as hydrogen sulfide.

The Standard Oil Co. of New Jersey finds that it is possible to convert residuum from ordinary cracking processes, and which is a heavy condensed oil consisting largely of unsaturated hydrocarbons, into an amount of gasoline equal to 100 per cent (by volume)of the original charge, and Krauch[6] states that the I. G. Farbenindustrie has converted coal tar by hydrogenation into gasoline, the latter representing 90 per cent of the tar and depending upon the catalysts employed, have made gasoline, kerosene, gas oils, lubricaing oils, etc., at will.

Kerosenes and lubricating oils also can be hydrogenated to make these products of more saturated nature; for instance, cracked distillates in the lubricating and kerosene range. Thus treating costs are diminished and the kerosene will possess better burning qualities, and the lubricating oils will withstand oxidation better.

The I. G.[7] desulfurize petroleum with hydrogen. Temperatures and pressures are lower than those required for hydrogenating the hydrocarbons.

The hydrogenation of mineral oil has not assumed a place of much industrial importance despite a large amount of experimental work that has been done, but at least one plant is in operation in Germany and the Standard Oil Co. of New Jersey is building plants in this country, largely following the practice of the I. G. in Germany. However, the hydrogenation of fats to make edible products and soaps is an industry that has assumed large proportions. Cottonseed oil, peanut oil, fish oil and other unsaturated oils are hydrogenated, so that the basic principles of hydrogenation of oils have long been known.

Exact control of temperature is necessary. It must be high enough to speed up the reaction, but not so high that the oil undergoes decomposition. Also in the hydrogenation of mineral oils the temperature must not be high or hydrogenated molecules split too much[8]. In most mineral oil work cracking and hydrogenation occur simultaneously; cracking to produce the unsaturated bodies and hydrogenation to saturate them.

If the mineral oil is already a cracked product then unsaturated molecules are present in large quantity and the temperature need not be so high as when a virgin oil, a saturated one, is used.

It is important that the catalyst used be finely divided so as to expose as large a surface of same as possible to the reacting constituents; the oil and the hydrogen.

The higher the pressure employed the more rapid and effective the hydrogenation becomes. The velocity of hydrogenation is given by the equation:

$$V = KC_1 C_2$$

where V = velocity of the reaction
K = the constant of the reaction
C_1 = active mass of the oil
C_2 = active mass of the hydrogen

Hence $C_1 C_2$ should be as large as possible, or in other words the product of the number of pounds of hydrogen per unit of time brought in contact with the pounds of oil should be large. Further, Le Chatelier's principle states that those reactions are favored by pressure in which the products of the reaction possess a smaller volume than the reacting substances. Thus Bergius has hydrogenated mineral oil at high pressures without the use of a catalyst. With the latter, temperatures and pressures can be reduced. The hydrogen and oil must be as intimately mixed as possible. In the fat hydrogenation industry this is accomplished by bringing the two into countercurrent flow with each other, and with mixing devices.

The nickel or other catalyst is prepared in very pure condition in fat hydrogenation work. Sulfur, chlorine, phosphorus and arsenic are the worst poisoners. Other catalysts than nickel which have been used are palladium, colloidal platinum, copper and iron.

Fokin[9] has shown that the reaction is monomolecular, i.e., that the saturation of a double bond with hydrogen at constant temperature and pressure follows the ordinary monomolecular formula,

$$K = \frac{x}{t} \log_e \frac{a}{a-x}$$

where a = total absorbable hydrogen
x = hydrogen actually absorbed after the time t.

The reaction is active at first and then slows down as saturation occurs, thus,

$$\frac{dx}{dt} = k\,(a-x)$$

The reaction is exothermic, i.e., heat is evolved. Maxted found that in fat hydrogenation, a charge of oil increased in temperature from 140 to 185 C.

The earliest work on hydrogenation was that of Berthellot, who hydrogenated coal and other substances with nascent hydrogen evolved from hydrodic acid, but it was the classical work of Sabatier and Senderens, in 1899, on the hydrogenation of oils by means of nickel and other substances, that laid the foundation for the present processes of oil hydrogenation. A

[6]Second International Coal Conference, Nov., 1928, Pittsburgh, Pa.

[7]E. P. 315,439. 1929.

[8]E. P. 311,759, covers the stopping of the reaction at an appropriate time.

[9]J. Russ. Phys. Chem. Soc., 40, 276, 1908.

basic patent for hydrogenating fats was issued to Norman[10], who described the hydrogenation of oils in a liquid condition by passing a current of hydrogen through them in the presence of nickel. It was declared invalid in 1913 because of inadequacy of disclosure.

Friess[11], in summing up the work of Waterman and Perkin (1925), Kling and Florentin (1926), Spilker and Zerbe (1926), Hugel and Friess, and Fricke and Spilker (1925), says that it has been shown that,

(a) Hydrogen may be simply added to the hydrocarbon molecule.

(b) Hydrogen may add itself to the molecule which then dissociates.

(c) The original molecule may be cracked directly.

(d) In either of the latter two cases the separate portions may again associate themselves into new molecules, which are, or are not, hydrogenatable.

(e) The course of the reaction is influenced favorably by pressure between maximum and minimum limits, but the temperature is most important. High temperatures are unfavorable, the optimum for high yield being about 450 C.

Waterman and Perquin[12] have noted that in hydrogenation there is not saturation of the unsaturated hydrocarbons already present in the coal, but only a hydrogenation of the products of decomposition obtained in cracking, and thus preventing polymerizing reactions that lead to tar and coke.

Kling[13] states that by means of the catalyzing agents, nickel, iron and cobalt, etc., it has been possible to fix molecular hydrogen at normal or high pressure on many organic molecules and that as far as molecular hydrogen is concerned, pressure alone is not sufficient to allow its fixation on the atoms of a stable compound, but such fixation is possible by means of a catalyst. Generally speaking, he notes, in hydrogenation, it is necessary to rupture certain molecular groupings. As soon as the hydrogen passes from its nascent to the molecular stage it is nearly impossible to obtain hydrogenation. Further, that hydrogenation increases with pressure, and dissociation with heat and to obtain effective hydrogenation it is necessary for a given pressure of hydrogen to increase the temperature moderately and to reach a point where a balance can be obtained between velocity of dissociation and velocity of hydrogenation of the nascent molecules.

If the optimum temperature occurs, cracking takes place and not hydrogenation.

[10]E. P. 1515, 1903.
[11]La. Rev. Petrol., July 28, 1928, p.1050.
[12]Jour. Inst. Pet. Tech., Aug. 1927, p.542.
[13]Second International Coal Conference, Pittsburgh, Pa., Nov. 1928.

The hydrogenation process which has received the most publicity is one developed by Bergius whereby coal, tars and oils are hydrogenated at high pressures of 40 to 100 atmospheres, and a temperature of about 450 C. (840 F.) No coke and little gas was formed when oil was hydrogenated.

Coal produced paraffins, aromatics, naphthenes, phenols, cresols and ammonia, but no unsaturates. One short ton of coal produced 170 gallons of oil, of which 45 gallons was a highly aromatic motor fuel. There was produced from a heavy asphaltic oil about 30 per cent of benzene, 25 per cent of kerosene, 37 per cent of gas and fuel oil and 8 per cent of gas and loss. One per cent of hydrogen was consumed.

The Bergius process, as such, is not in commercial operation. The I. G. took it over but operates with a catalyst. Krauch states that from 100 gallons of lignite can be produced 100 gallons of lubricating oil and that according to the catalyst used there can be produced gasoline, kerosene or lubricating oils at will. The I. G. have a plant at Leuna, Germany, where it is said 300,000 tons of motor fuel are made per year by hydrogenating mineral oils, tars and pitches.

One of their patents[14] covers the action of hydrogen on coal, tar, mineral oils and their distillates at temperatures above 300 C. and preferably under pressure, in the presence of oxides of elements of the third to the seventh groups of the periodic system, precipitated in small proportions on metals and alloys. Examples are given of the production of benzines, the main portion of which boils below 200 C. from mineral oil and lignite tar oil, using aluminum coated with uranium nitrate or boric acid or ammonium nitrate, or zinc wool evaporated with a suspension of blue oxide of molybdenum at about 450 C. and 200 atmospheres pressure.

In one of the patents[15] of the Standard Oil Co. of New Jersey, oil is subjected to a pressure of 50 to 100 atmospheres, and 750 to 850 F., and agitated with hydrogen. A vessel is used having non-reactive steel alloy surfaces. Metal oxides or other catalysts, e.g., a mixture of 9 pounds of chromium oxide with 1 pound of molybdenum oxide is suspended in the oil. In a second example, oils containing large amounts of unsaturated compounds, e.g., cracked oils, are hydrogenated without cracking by treatment at 650 F. and 100 atmospheres.

In the latter case unsaturated bodies are present in quantity, e.g., in the residuum of cracking plants. In the former case cracking and hydrogenation are carried on simultaneously.

[14]Fr. Pat. 65,891, Mar. 1928.
[15]E. P. 308,297, Mar. 21, 1928.

Distillation—Fractionation

Thirty-one articles have been published since March, 1929 in National Petroleum News on the subject of increasing yield of products—improving their quality—reducing manufacturing costs — equipment design—

This averages a little more than one article per issue on this one phase of refinery operation. For your file reference we list them below:

1930

Col. Burrell's series on modern refining
Feb. 12, p. 51; Feb. 5, p. 63; Jan. 29, p. 61; Jan. 22, p. 57; Jan. 15, p. 55; Jan. 8, p. 61; Jan. 1, p. 59; Dec. 18, 1929, p. 69; Dec. 4, p. 85; Nov. 20, p. 69.

Vacuum distillation unit solves many problems
Feb. 5, p. 69

1929

Applying vacuum distillation to producing lubricating oils — Nov. 6, p. 30

Steam distillation suggested for charcoal tests — Nov. 6, p. 61

Degasification, fractionation and storage of pressure distillate — Oct. 30, p. 60

Ten methods to modernize old shell stills — Oct. 30, p. 83

Laboratory aids in the control of fractionators — Oct. 30, p. 181

Precautions for obtaining high distillation efficiency — Oct. 30 p. 193

Pipe stills improve products, cut costs — Aug. 14, p. 93

New bubble towers from old stills by use of special trays are low in cost, high in efficiency — July 24, p. 65

Modern lube oil manufacture
July 10, p. 73; July 3, p. 71

Lube making from Ranger crude
June 26, p. 80; June 19, p. 78; June 5, p. 73

Refinery makes over old equipment — June 12, p. 64

Farthest west refinery in Texas — June 12, p. 74

Distillation, light cracking and desalting West Texas crude — May 29, p. 65

Vertical tube still developes 70% efficiency — April 24, p. 75

Improving fractionation in cracking systems — March 13, p. 78

1928 refinery progress — March 6, p. 69

Still is most important of absorption plant — March 6, p. 72

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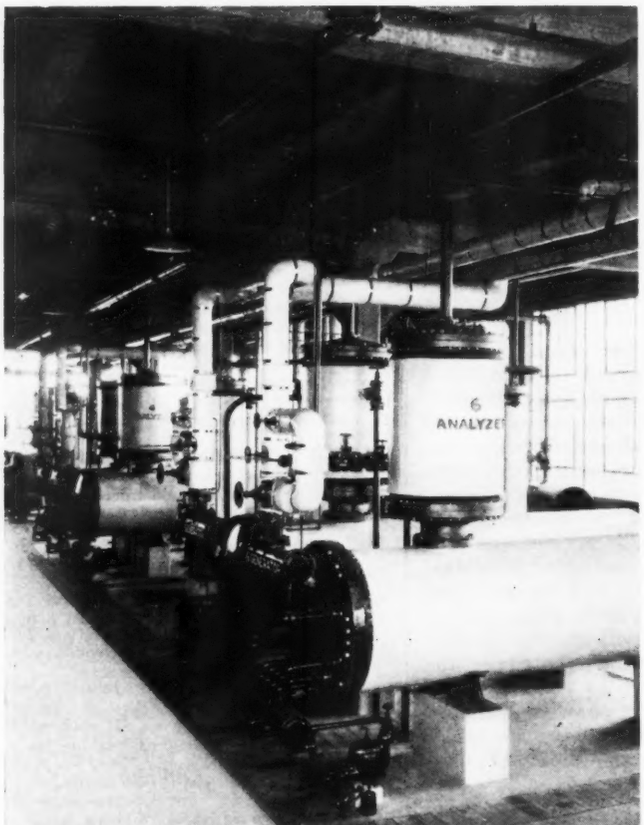

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Cracking Methods Studied Through Eyes Of Refiner of Russian Crude

By Dr. Leopold Singer, Vienna*

Translated from Petroleum Zeitschrift

Part 2

THE second cracking method mentioned in Part I under ideal conditions, should give a high yield of cracked gasoline and a residue of good characteristics. Generally, however, the production of gasoline must be limited by consideration of coke formation because high yield of coke not only degrades the quality of the residue but also imposes frequent cleaning of the apparatus which reduces production. For that reason the ratio of coke formation to gasoline yield is an important point to be determined in the investigation.

The literature is lacking in any systematic investigation of the rapidity of coke formation in cracking and often one finds irrelevant statements. Salnikoff said, "Cracking at low temperatures and through a short time reduces the formation of coke and through this one gets also a low yield of gasoline."

That the rate of coke formation declines with the decline of temperature is correct, but in the same circumstances, as the authors have earlier shown, the rapidity of gasoline formation is reduced also and the foregoing investigation corroborates this.

The universal rule is: for every petroleum product, independent of the cracking temperature, there is a fixed amount of coke formed corresponding to a fixed yield of gasoline.

In order to prove this peculiarity beyond doubt, a series of cracking experiments was carried on at a constant temperature of 797 F. The time element was varied and with each experiment, the yield of gasoline and carboids was determined. Differing yields of gasoline were compared with a corresponding quantity of carboids formed.

When the per cent of gasoline yield is taken as the abscissa and the per cent of carboid as the ordinate, so a characteristic curve for each petroleum product can be made which shows what quantity of coke can be given for every gasoline yield. These curves, or tables, are made independent of temperature and time element, which is very important, because small fluctuations in the temperature determination do not affect the result.

The following results were obtained from a series of experiments:

One kilogram of the material under investigation at 797 F and 10 to 20 atmospheres pressure was cracked for 30 minutes, and the following determinations were made:

Quantity of carboids, the yield of gasoline (fraction boiling below 392 F); quantity of kerosene (fraction boiling between 392 and 572 F), as well as the residue, (that boiling above 572 F).

If these results are unsatisfactory, the residue above 572 F can be mixed with the kerosene fraction and the constant can be again determined for the mixture. However, if the residue has the required characteristics for fuel oil, then the cracked kerosene can be regarded as potential gasoline, because, through recracking, according to the facts established by the authors and by Cross, 80 per cent of gasoline can be obtained.

If the carboids are formed only in small amounts, in further experiments, the time of cracking is lengthened until the carboid content reaches 1 to 2 per cent of the quantity of oil charged. The investigation of the cracked products proceeds as described. In many cases, the time of the experiments reaches 1 to 1½ hours.

From the figures obtained, a curve is prepared to compare the gasoline yield and the quantity of carboids. With paraffin base charging stock, it is further important to determine the cold test of the fuel oil obtained. From paraffin base Grosny fuel oil, the following figures were obtained by cracking at 797 F under 10 atmospheres pressure:

Time of cracking in minutes	Per cent gasoline yield on charging stock	Per cent carboids on charging stock	Cold test of fuel oil (Residue above 200 C)
35	7.8	0.50	+10 C
62	17.8	0.95	— 3 C

By assembling data of a similar sort in tabular form, the intensity of cracking suitable to furnish a given end product is determined.

If one, for example, wishes a coke formation of no more than 0.5 per cent, he will get only 8 per cent gasoline yield and the cold test of the fuel oil is 10 C. If one is willing to accept 1 per cent of coke, ne can get 20 per cent yield of gasoline and the cold test of the fuel oil will be minus 3 C. If it is desired to state the cracking property of petroleum products, these must be established by working conditions.

For example, with a permissible coke formation of about 1 per cent, the cracking characteristics of Grosny paraffin base fuel oil are as follows: gasoline yield, 20 per cent; fuel oil, 75 per cent with a solidifying point of —3 C; gas, 5 per cent; cracking time, at 425 C, 60 to 70 minutes. Inasmuch as it is well known that the speed of cracking is doubled with every 10-degree C temperature rise, it is easy to calculate results at any working condition from these figures.

As an illustration, to determine the gasoline yield and cracking time element, for paraffin base Grosny fuel oil at 450 C (842 F) with a permissible upper limit of 0.75 per cent, (figured on end product) or carboids, take a quantity of gasoline which corresponds to a quantity of 0.75 per cent carboids, as shown in the curve, Fig. 1.

The time element at 450 C is determined by dividing the corresponding cracking time, at 425 C, by 6, or more exact, by 5.7. By this calculation, it is found that at 450 C, a gasoline yield of 15 per cent would be obtained and the cracking time would be 7 to 8 minutes.

It should be noted that the quantity of carboids formed, as determined by the above method, corresponds to operating results obtained in a single cycle cracking. If the material is recycled, the production of coke for the same amount of gasoline is reduced, because the recycled product has lost its heavy fractions, which are chiefly responsible for coke formation.

Cracking of Paraffin Base Grosny Fuel Oil

The cracking of this oil has important practical interest, because in the present year, not less than 77.5

Table 1

Light cracking of paraffin base residue for reducing the cold test:*

Number of experiment	Deg. C	Pressure atmospheres	Time in minutes	Specific gravity at 50 C	Cold test	E. 50	Flash point	Gum-like matter per cent	Carboids per cent	Gas and loss per cent
53	425	3-4	7	0.898	+25	3.34	64	31	0.00	1.9
54	425	5	12	0.894	+23	3.00	57	30	0.04	2.2
55	425	5-10	17	0.894	+13	2.23	50	24	0.16	2.5
56	425	5-10	22	0.889	+11	3.12	44	35	0.34	3.0

*In the first two experiments, a pressure of 10atmospheres could not be reached because avery small amount of gas was formed.

per cent of the total production of Grosny oil is of paraffin base and it can be accepted with certainty that this proportion in the coming years will be considerably increased.

In the current year, the quantity of paraffin base fuel oil obtained through distillation of 21,000,000 barrels of Grosny crude, was 9,000,000 barrels. The difficulty of transporting paraffin base fuel oil in winter time makes it necessary to store the oil and the transportation system, therefore, is overloaded in the spring and fall. The building of a pipe line between Grosny and Tuapse has not materially changed the situation.

Cracking of Paraffin Base Residue for the Production of Fuel Oil

Inasmuch as the reduction of cold test of Grosny residue is of great practical importance, the authors carried out a number of experiments to determine whether cracking method 1 (light cracking) was applicable. Residue G was used in these experiments. It has the following properties:

Specific gravity at 15 C.....0.906
Cold test (Dold) .....plus 34 C
E. 50 .....4.98
Gum-like matter 30%
Flash point (Marcus) ....120 to 126 C
Boiling below 200 C..... 0
Boiling above 300 C 4.8%

Through increasing the cracking time, the cold test was noticeably lower. The same was true of the specific gravity, the viscosity and the flash point. Very satisfactory results were obtained in the last experiment with 22 minutes of cracking time, by which the solidifying point of the residue was reduced 11 C.

In this beginning phase of cracking, very little coke formation took place, so that in the last experiment, the quantity of coke reached only 0.34 per cent, figured on the chart. Gas and loss did not exceed 2 to 3 per cent and when the unavoidable loss through the clinging of distillate and residue on the walls of the apparatus is considered, the actual loss is even lower.

It therefore appears that Grosny residue, with a cold test of 34 C, can be converted at a very small loss (2%) into a fuel oil of very much lower cold test and other very good properties.

Cracking of Paraffin Base Oil to Make Gasoline and Fuel Oil

This method was studied more in detail by the authors. In the first place, two factors were to be determined, first, the greatest possible yield of gasoline without excessive coke formation; second, cold tests of the fuel oil obtained by cracking, considering either the residue boiling above 200 C (392 F), or above 300 C (572 F) fuel oil. Results obtained at a temperature of 425 C are given in Table 2. In this, the gasoline and kerosene yield are shown in relation to the formation of coke and the cold test of the residue. In cracking a paraffin base residue, as a rule, a considerable amount of coke is formed.

By this method coke formation begins almost at the first moment, whereas, in the first cracking, the paraffin base distillate, no coke formation occurs. It is clear that the coke formation in cracking paraffin base residue comes entirely from the asphalt contained in it, which is easily converted into coke.

The oil investigated 1.5 per cent asphalt, which is much more than all the other residues and heavy oils that the authors have studied, and by reason of this peculiarity, the cracking of paraffin base Grosny residue presents a special problem. It is necessary to hold down the reaction time, which means reducing the gasoline yield.

With a cracked gasoline yield of only 8 per cent, only 0.3 to 0.5 per cent carboids is obtained, at 12 per cent yield, about 1 per cent and as the cracking operation proceeds, the yield of carbides mounts very rapidly. For instance, at 31 per cent yield, carbides amount to 5 per cent. (See Fig. 1, curve 4).

If one is satisfied with a coke yield of 1 per cent, then the cracking conditions conforming to the last experiment in Table 2, are highly favorable, because one obtains a gasoline yield of about 20 per cent and a cold test of the residue fuel oil, boiling above 200 C. of minus 3 C. On the other hand, if a residue boiling above 300 C. with a cold test of 7 C. is regarded as a usable fuel oil, then the yield of cracked gasoline can be increased 30 to 35 per cent by recycling the cracked kerosene.

Table 3 shows the other properties of both these types of fuel oil, that is, residues boiling above 300 and 200 C.

Table 3

Name of products	Specific gravity 15 C	Cold test C	Coke per cent	Gum-like matter
Residue above 200 C	0.902	—3	1.27	34
Residue above 300 C	0.933	+7	1.67	58

Recycling of cracked kerosene does not increase the coke formation although it does increase the gasoline yield 35 per cent. This is because kerosene in cracking, forms no coke. In general, recycling in cracking operations, considerably reduces the formation of coke, but on the other hand, it is accompanied by a reduction of throughput capacity of the equipment.

The authors have also studied the cracking of paraffin base residue at 842 degrees F. and they point out that the results are the same as those given in their first publication, wherein it was established that with a temperature rise of 25 degrees C. the speed of reaction is heightened almost six-fold.

In other words, there is generally a doubling of cracking rapidity to every 10 C. (18 degrees F.) temperature rise. The quantity of coke formed is in direct proportion to the gasoline yield, with one exception.

Table 2

Cracking of Paraffin Base Residue

Cracking Conditions						Percentage of Yield Calculated on Charge			
Experiment number	Temperature celsius	Pressure atmospheres	Time minutes	Per cent Gasoline gasoline boiling below 200	Kerosene 200-300 C	Carbides	Cold test residue above 200 C	Cold test residue above 300 C	Gas and loss per cent
55	425	5-10	18	5.2	.....	0.16	.....	.....	2.5
57	425	7-10	22	6.5	12.4	0.41	+18	+26	2.8
56	425	5-10	23	7.8	.....	0.34	+19	.....	3.6
58	425	8-10	35	7.8	12.8	0.50	+15	+20	4.3
60	425	10	48	11.3	17.8	1.01	+ 1	+17	5.5
61	425	10	62	17.8	17.7	0.95	— 3	+ 7	5.6

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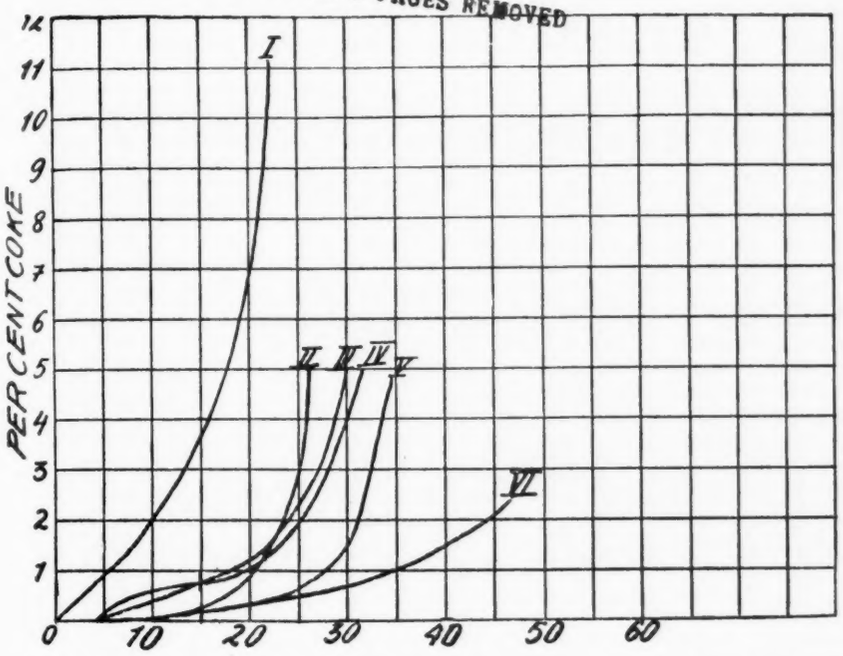

Fig. 1—Relationship of coke formation to gasoline yield from different charging stocks

Table 4

Cracking of Paraffin Containing Grosny Residue at 400 and 450 C.

Experiment number	Degrees C	Cracking Conditions Pressure atmospheres	Time minutes	Average percentage gasoline	Average percentage coke
51	400	5	365	20.4	(4.82)
61	425	10	62	17.8	0.95
71	450	15	10	23.5	1.05

(Experiment 51) where a considerable increase of the coke formed as a consequence of accidental local overheating and a long time of cracking.

By analyzing the cracking procedure at 400 it can be seen that the speed of gasoline formation in the first six hours is in direct proportion to the time of the reaction. That is, in 1½ hours, 5.5 per cent gasoline was formed; in 3 hours, 11.2 per cent was formed; in 6 hours, 20.4 per cent was formed (See Experiments 48, 49, 51, Table 2). In the first 1½ hours the proportion of gasoline formed was the same as in the next 1½-hour period.

This is contrary to the opinion of other authors* according to whom, after the beginning of the cracking reaction, a so-called induction period exists, during which no gasoline is formed. After the installation of the pressure apparatus at 50 atmospheres and for work at 932 degrees F., further experiments were made with paraffin base residue at 425 degrees C. and 30 minutes, and under pressures of 10, 20, 30 and 40 atmospheres. Table 5 shows the results.

These experiments are important insofar as they show beyond question, that the yield of cracked gasoline and kerosene are independent of the pressure if the pressure is kept within the wide limits from 10 to 40 atmospheres. The pressure only supports the carrying out of cracking in the liquid phase, inasmuch as it retards the vaporization.

This observation, however, should not be taken to mean that high pressure is not necessary in cracking or that cracking under low or atmospheric pressure is possible, as recommended by several authors.

Insufficient pressure in cracking occasions unnecessary heat losses in the vaporization process and reduces the heat transfer of the materials and makes possible occasional overheating, as Cross has shown. The considerable vaporization further hinders the bringing of the product to cracking temperature and correspondingly increases the time of actual cracking.

All this causes reduction of the gasoline yield at each pass and makes recirculation necessary and this again cuts down the capacity of the apparatus.

Particularly interesting are the cracking experiments at 40 atmospheres pressure, because they correspond to the large size operating conditions as they are carried out by Cross and Vickers. Table 6 shows three further experiments which were carried out at this pressure.

The cracking experiments at 40 atmospheres, show considerably greater loss figures on account of leakiness. If this is corrected it is found that the total gasoline yield does not differ greatly from the yield at 10 atmospheres. Also, there is very little difference in the quantity of coke whether one operates at 10 or 40 atmospheres pressure.

In comparing these two methods of cracking paraffin base residue, the advantage of direct cracking becomes apparent. The yield of gasoline is reduced about 8 per cent, but the yield of fuel oil of good quality is considerably increased and the fuel that would be used in the distillation of the oil is saved. On the other hand, one would have to clean out the cracking equipment more frequently because of about 1 per cent greater formation of coke, figured on the charge.

Table 5

Cracking of Paraffin Base Residue at Different Pressures

Experiment number	Cracking Conditions Temp. C	Pressure atmospheres	Time minutes	Percentage Yield on Charge Gasoline below 200 C	Kerosene 200-300 C	Residue over 300	Coke	Gas and loss per cent
64	425	10	32	9.8	15.2	71.5	0.59	2.7
65	425	20	32	9.7	14.1	70.4	0.57	4.9
66	425	30	32	9.8	14.3	68.8	0.83	6.1
67	425	40	32	9.9	15.3	67.0	0.84	7.6

Table 6

Cracking of Paraffin Base Grosny Residue at 40 Atmospheres Pressure

Experiment number	Cracking Conditions Temp. C	Pressure atmospheres	Time minutes	Percentage Yield Based on Charge Per cent benzine—200	Yield kerosene fraction to 300	Residue above 300	Coke	Gas and loss
67	425	40	32	9.9	15.3	67.0	0.84	7.6
68	425	40	62	15.0	16.7	56.3	1.33	9.8
69	425	40	92	19.5	18.7	47.5	3.37	13.7

Adds Building Division

CLEVELAND, Feb. 4.—Arthur G. McKee & Co., Cleveland and London, announces extension of its activities to include general industrial building engineering and construction. The company has heretofore largely limited itself to building operations incidental to its specialized work in the Americas, Europe and the Far East.

A. R. McCreary of New York City has been appointed manager of the building construction department and comes to this engineering and construction organization with an extensive industrial and general building experience, having been vice president and general manager of the Crowell-Lundoff-Little Co. of Cleveland and subsequently connected in executive capacities with the Foundation Co. and Hoggson Brothers, both of New York City.

U. S. Can Refine 594,000,000 Barrels of Gasoline in 1930

TULSA, Feb. 12

THE rate of increase in the consumption of gasoline has lagged far behind the increase in production made possible by greater refinery capacity and technical skill J. M. Wadsworth, vice president in charge of refining for the Independent Oil & Gas Co. told members of the Mid-Continent section of the American Institute of Mining and Metallurgical Engineers at a meeting of that body the evening of Feb. 11.

This condition he said, meant a narrowing of the margin of profit on which the refinery could depend, and called for close study of the economics of the situation. There was no reason, he said, to believe that the progress of the past ten years in technical skill, with its increased possible recovery, would not be duplicated in the next decade. This made it doubly important, he said, that a close watch be kept on the total amount of refinery runs, consumption, and the economic situation in general.

Mr. Wadsworth pointed out that the refinery capacity in the country had increased from about one and one quarter million barrels capacity per day in 1918 to about three and three quarters million barrels capacity per day in 1929. Along with the increase in refinery capacity has come an increase in technical skill which has greatly added to the yield of gasoline extracted from a barrel of oil, he said. In 1918 the average recovery of gasoline from a barrel of crude was about 25 per cent. In 1929 the recovery was close to 44 per cent.

Mr. Wadsworth said that 450,000,000 barrels of gasoline was the estimated consumption for 1929 and that the capacity of the refineries made possible a production of 594,000,000 barrels of gasoline. Such a situation made necessary either a reduction of refinery runs, or the carrying of large stocks of gasoline. Either of these alternatives meant additional expense to the refinery operator, either in the carrying and storage charges for the gasoline, or in the carrying charge on the idle equipment.

The refiners, said Mr. Wadsworth, have been studying their text books, and have discovered that applied science has had a great deal to offer them. With this condition continuing for the next few years the development of new equipment and methods will make necessary the junking of much equipment still capable of giving service, which will add to the difficulties of operating a refinery at a profit, he said. Considerable study of the economic text books should accompany the study of technical problems, he said.

Theory of Absorption Discussed at Meet

LOS ANGELES, Feb. 14.—At a meeting of approximately 265 members of the California Natural Gasoline Association, A. Kremser, chief engineer of the research and development department of Standard Oil Co. of California, presented a paper on the "Theory of Absorption in Natural Gasoline Plants."

The paper discussed an absorption factor to be derived from known and unknown conditions in operating units and used in determining the conditions necessary to obtain the quality or amount of production of natural gasoline. It also described the design of equipment for economical operation and contained considerable information that was of particular interest to the assembled members.

Discussion which followed the paper was participated in by men from all branches of the industry including: Ed. G. Ragatz, Union Oil Co.; E. R. Cox, The Texas Co.; W. W. Robinson Jr., The Texas Co.; and Henry N. Wade, J. A. Campbell Co.

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New Patents

Prepared by R. E. Burnham, patent and trademark attorney, Continental Trust Building, Washington, D. C., from whom copies may be obtained at the rate of 20c each. State number of patent and name of inventor when ordering.

January 21, 1930

REFINERY

Process and apparatus for treating petroleum oils—Walter M. Cross, Kansas City, Mo. Filed Dec. 17, 1925. No. 1,744,262.

Fractional distillation—William F. Stroud, Jr., Moorestown, N. J., and Richard B. Chillas, Jr., Philadelphia, Pa., assignors to Atlantic Refining Co., Philadelphia. Filed Dec. 17, 1928. No. 1,744,421.

Apparatus for reactivating charcoal—Charles N. Whitaker, Wilmington, Cal., assignor to Shell Co. of California, San Francisco. Filed Dec. 7, 1926. No. 1,744,429.

Propeller-drive means (for oil-cracking stills)—Charles H. Jenkins, St. Louis, Mo., assignor to Jenkins Petroleum Process Co., Chicago, Ill. Filed Dec. 24, 1926. No. 1,744,474.

Process of cracking mineral oil—John H. Pew, Ardmore, Pa., assignor to Sun Oil Co., Philadelphia, Pa. Filed Feb. 10, 1926. No. 1,744,574.

Treating hydrocarbon oil—Claude W. Watson, Port Arthur, Tex., assignor to Texas Co., New York, N. Y. Filed Nov. 11, 1927. No. 1,744,599.

Method of refining oil, refining agent therefor, and method of producing same—Robert O. Boykin, Los Angeles, Cal. Filed April 30, 1924. No. 1,744,610.

Removal of petrolatum from hydrocarbon oils—Robert S. Lane and Samuel A. Montgomery, Wood River, Ill., assignors to Standard Oil Co. of Indiana. Filed March 6, 1925. No. 1,744,648.

PRODUCTION

Casing-spider and the like—Robert H. Folsom, Los Angeles, Cal. Filed March 23, 1928. No. 1,744,380.

Slip-releasing means for casing-spiders and the like—Robert H. Folsom, Los Angeles, Cal. Filed March 23, 1928. No. 1,744,381.

Means for locating, testing, and cleaning leaks or holes in well-casings—Paul H. Granger, Los Angeles, Cal. Filed July 5, 1928. No. 1,744,698.

MISCELLANEOUS

Process of making resins—Jacque C. Morrell and Gustav Egloff, Chicago, Ill. assignors to Universal Oil Products Co., same place. Filed Jan. 3, 1928. No. 1,744,135.

Process of producing alkyl sulphates and alcohols therefrom—Sidney Born, Bartlesville, and Robert M. Isham Okmulgee, Okla. Filed May 1, 1919. No. 1,744,207.

Production of dialkyl sulphates—Robert M. Isham, Okmulgee, Okla. Filed March 16, 1923. No. 1,744,227.

Self-locking ladder for floating roof tanks—Charles S. Morgan and John T. Howell, Los Angeles, Cal., assignors to Union Oil Co., same place. Filed Jan. 9, 1929. No. 1,744,239.

Floating roof for storage-tanks—Ludwig Kniel, Walnut Park, Cal. Filed Sept. 26, 1927. No. 1,744,640.

REFINING

Recovery of gasoline—Harold B. Bernard, Tulsa, Okla., assignor to Sinclair Oil & Gas Co., same place. Filed April 17, 1925. No. 1,743,185.

PRODUCTION

Pumping apparatus—Irwin B. Winsor, Tulsa, Okla. Filed June 21, 1928. No. 1,743,259.

Centrifugal pump assembly—Aladar Hollander, Berkeley, Cal., assignor to Byron Jackson Pump Co. Filed May 7, 1928. No. 1,743,348.

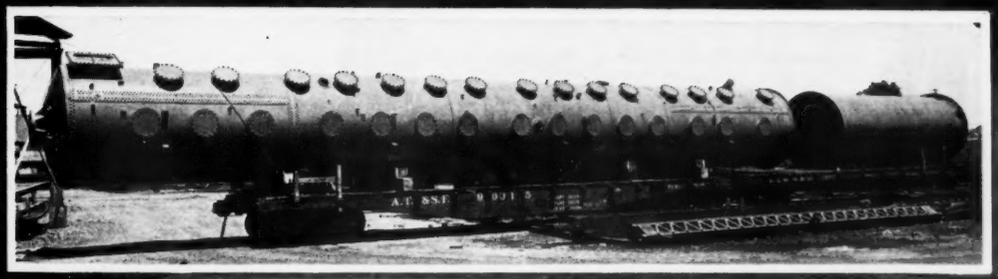
Fishing-tool—William M. Jenkins, Fullerton, Cal. Filed April 27, 1927. No. 1,743,455.

Underreamer—Lawrence Campbell, Kansas City, Mo. Filed April 7, 1927. No. 1,743,528.

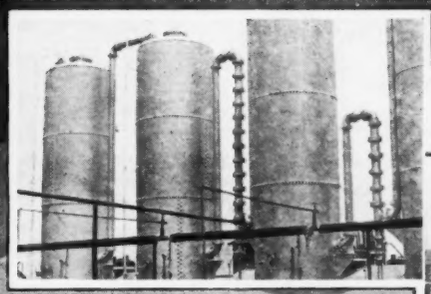
Oil-pumping apparatus—Gunnar C. Engstrand, Brooklyn, N. Y., assignor to Salvage Process Co., New York, N. Y. Filed Feb. 18, 1927. No. 1,743,762.

(*Continued on Page* 76)

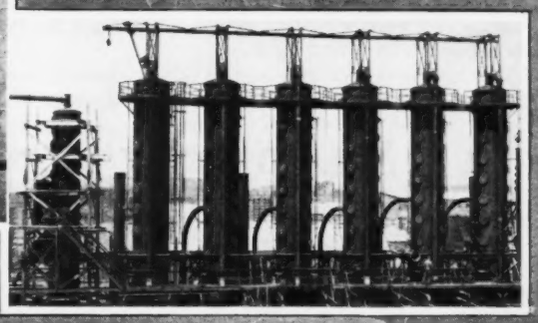
PACING PROGRESS!



Whether it's a Bubble Tower,



—a continuous Treating Plant,



—a re-modeled Shell Still Battery

WINKLER-KOCH continues to keep refiners throughout the nation a step ahead in the modern trend of refining. Let them handle your problems. A letter, or wire, will bring complete information.

—or a complete refinery that's needed

The WINKLER-KOCH ENGINEERING CO.

Consulting and Construction Engineers

429 FIRST NATIONAL BANK BLDG.

WICHITA, KANSAS

CALIFORNIA OFFICE. 1205 PACIFIC NATIONAL BANK BUILDING. LOS ANGELES

Billions of Bubbles

Note It Down

LOADING EQUIPMENT THAT . . .

Saves time in hooking up and unhooking (snaps in place),

Conserves gasoline (prevents escape of vapors), and

PREVENTS FIRES . . .

Is indispensable to progress-minded refiners and distributors.

C&B Safety Loading Equipment has come to the fore by sheer dint of superiority. It is a Campbell product. Campbell products are never put on the market until they are right.

C&B will be on exhibition at the Oil Equipment and Engineering Exposition, Los Angeles, March 16-23.

In the meantime send for Bulletin 5.

J. A. CAMPBELL CO
Natural Gas Engineers
CONSULTING DESIGNING CONSTRUCTING
PHONE-416-93
P.O. DRAWER 669
LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY

Originators of Oil-Froth Absorbers

Low-Cost Insurance
for Keeping High-Grade Customers

YOU value your customers and want them to be satisfied.

Why not clinch their satisfaction by giving the lube oils they buy a final clarification at the shipping point? Be sure you ship clean oils.

You can do this very economically with the Sweetland Pressure Filter. In writing for more information give us details regarding the oils you would want to filter.

OLIVER UNITED FILTERS INC.

SAN FRANCISCO, Fed. Reserve Bank Bldg. NEW YORK, 33 West 42nd St.
CHICAGO, 565 Washington Blvd. LONDON, W. C. 1, 150 Southampton Row
PARIS, 63 Ave. des Champs Elysees.
T. L. Genter, Concessionaire

New Patents

(*Continued on Page* 74)

Renewable cutter underreamer—John Grant, Los Angeles, and Stewart L. Campbell, Berkeley, Cal.; said Campbell assignor to said Grant. Filed May 12, 1926. No. 1,743,769.

Swab—Harvey R. Standlee, Tulsa, Okla. Filed May 15, 1929. No. 1,743,937.

Well-bucket—Kneud E. Little, Tahlequah, Okla. Filed July 20, 1928. No. 1,743,973.

MISCELLANEOUS

Liquid-dispenser—Hugh M. Ross, Woodhaven, N. Y., assignor to Adriance Machine Works, Inc., Brooklyn, N. Y. Filed Sept. 28, 1923. No. 1,743,485.

Telltale mechanism for tank-cars—Ralph E. Wilder, Bethlehem, Pa., assignor to Bethlehem Steel Co. Filed Jan. 6, 1927. No. 1,743,743.

Liquid-measuring device with two alternately filled and discharged gauged vessels—Hermann Wydler, Bern, Switzerland. Filed Aug. 4, 1925. No. 1,743,745.

Wax sweating and crystallizing apparatus—Hugh L. Allan and James Moore, Burma, British India, assignors to Burmah Oil Co. Ltd., Glasgow, Scotland. Filed Feb. 9, 1928. No. 1,743,746.

January 28, 1930

REFINING

Combined purifying and distilling apparatus.—Kurt E. Buettner, Dallas, Tex. Filed Mar. 13, 1928. No. 1,744,747.

Stuffing-box for pressure-stills.—Frank E. Wellman, Kansas City, Kans., assignor to Kansas City Gasoline Co., same place. Filed June 5, 1922. No. 1,745,200.

PRODUCTION

Fishing-tool.—William J. Bromley, Washington, Pa., assignor to Washington Mold, Machine & Foundry Co., same place. Filed Dec. 15, 1926. No. 1,744,722

Well-pump.—Harold F. Watkins, Oakland, Cal., assignor to Watkins Intermitting Pump Co., San Francisco, Cal. Filed Aug. 8, 1927. No. 1,744,938

Unit ratchet packer.—Albert L. Roco, Houston, Tex., assignor to Layne & Bowler Co., same place. Filed Nov. 23, 1926. No. 1,745,271.

Fishing-tool.—John M. Sauls, Pampa, Tex. Filed Feb. 1, 1928. No. 1,745,274.

Well-beam saddle.—Ben A. Hayward, Okmulgee, Okla. Filed Feb. 9, 1928. No. 1,745,298.

Pump-rod swivel.—Theodor P. Novick, El Dorado, Ark. Filed Sept. 23, 1927. No. 1,745,310.

MISCELLANEOUS

Process of converting gaseous alipatic Ethylene hydrocarbons into liquid hydrocarbons.—Eloi Ricard, Melle, France. Filed July 24, 1923. No. 1,745,028.

Process of restoring the quality of used gasoline.—Ford H. McBerty, Poughkeepsie, N. Y., assigor to De Laval Separator Co., New York, N. Y. Filed June 13, 1927. No. 1,745,108.

Asphalt and road oil and process of producing the same.—Jacob F. Faber, Inglewood, and Marvin L. Chappell, Los Angeles, Cal., assignors to Standard Oil Co. of California. Filed Dec. 20, 1926. No. 1,745,155.

Process of treating oil.—William D. Harris and Robert V. Aycock, Kansas City, Mo., assignors to Randall Mfg. Co., same place. Filed Feb. 13, 1928. No. 1,745,167.

February 4, 1930

REFINING

Process of treating acid sludge and fuel product obtained therefrom—Ralph A. Halloran, Berkeley, William N. Davis, Oakland, and George A. Davidson, San Francisco, Cal., assignors to Standard Oil Co. of California. Filed Sept. 6, 1923. No. 1,745,692.

Recovery of entrained oils from filter-cakes (recovering entrained lubricating oil)—George F. Olsen, Los Angeles, Cal. Filed Jan. 22, 1927. No. 1,745,837.

Art of pressure distillation—Robert E. Humphreys, Whiting, Ind., assignor to Standard Oil Co. of Indiana. Filed April 9, 1921. No. 1,745,931.

Art of separating hydrocarbons—Warren K. Lewis, Newton, Mass., assignor to Standard Oil Development Co. Filed Aug. 16, 1922. No. 1,746,197.

Vacuum distillation and rectification of paraffin distillate—Nathaniel E. Loomis, Elizabeth, N. J., and Warren K. Lewis, Cambridge, Mass., assignors to Standard Oil Development Co. Filed June 21, 1924. No. 1,746,198.

ON THE LAZY BENCH

National Petroleum News

Turn About

In the days before oil was discovered in West Texas, a traveling man stopped for the night at a dry-land ranch near Wink. As he discussed the affairs of the country with his host he became more and more puzzled as to how the little ranch paid its way. At last he ventured the question: "How in the world do you make a go of things at all?"

Indicating the hired man, who was sitting at the far end of the supper table, the host replied: "You see that feller there? Well he works for me and I can't pay him. In two years he gets the ranch. Then I work for him till I get it back."

—The Vent

* * *

"Was your charity ball a success?"

"Indeed, yes. Every modiste in town was able to take a trip to Europe, and the receipts enabled us to repaint the fence around the orphanage."

—The Texaco Mission

* * *

What a funny little thing a frog are
Ain't got any tail
Almost hardly
And when he hop—he yump
And when he yump, he sit
On his little tail
What he ain't got
Almost hardly

—Cash & Carry Stations

* * *

Smith (meeting Jones after many years): "Yes, our old friend Brown has gone to his everlasting rest!"

Jones: "What? Did he get that government job after all?"

—The Southwestern Bulletin

* * *

"I'm going home to mother," she sobbed, "and I never want to see you again."

"Too late," he said, "your mother went home to grandmother last night."

—Magnolia Oil News

* * *

Don't Kill the Motor

Dan: "Why are you painting your car black?"

Van: "In memory of my dead battery and missing spark."

—The Loreco Diamond

* * *

The Gossip—I hear your store was robbed last night. Lose much?

The Optimist.—Some. But it would have been worse if the yeggs had got in the night before. You see, yesterday I just finished marking down everything 20 per cent.

—Fusion Facts

Fairy Tales

A flapper powdered and rouged her face in the morning and not once did she apply the puff until the next day.

A young magazine solicitor who admitted he was not working his way through college.

—En-ar-co National News

* * *

The motorist had an accident with his light car on a country road. He limped painfully to a telephone box and called up the nearest garage. "Hello," he said, "I've turned turtle. Can you do anything for me?"

"I'm afraid not," came the sweet feminine reply. "You've got the wrong number. What you want is the zoo."

—The Texaco Mission

* * *

An old farmer made a trip to the city and decided to startle the wife by appearing in brand new raiment. To save wear and tear on the new suit he placed it in the back of the wagon. A few miles from home he took off his old clothes and tossed them off a bridge into the river.

He was surprised to see that the new clothes had dropped out of the wagon.

"Giddap, Maude," yelled the old man, pulling down his shirt tail as he realized his plight. "We'll surprise her anyhow!"

—The Loreco Diamond

* * *

"What have you there?"

"Some insect powder."

"Good heavens! You aren't going to commit suicide?"

—The Southwestern Bulletin

* * *

Speed Cop (majestically taking out his book): "What's your name?"

The Culprit: "Aloysius Alastair Van Rensellaer."

Speed Cop (putting book away): "Well, don't let me catch you again."

—The Texaco Mission

* * *

It was a very cold day and Isaac and Cohen had walked about four miles without making a single remark.

"Vy don't you say something?" said Cohen.

"Freeze your own hands!" said Isaac.

—The Sohioan

* * *

A Head Start That Failed

Man was made before woman to give him a chance to think of a good reply to her first question.

—Magnolia Oil News

All-in-One-Folio

Your Name in Gold FREE

$25.00

Folio opens out to full Display

361—This Folio is substantially made from heavy, smooth, 5-oz. black cowhide. No flaps—Solid ends. Opens out for full display. Contains eighteen 4-oz. bottles with metal capped corks. Bottles partitioned separately. Case also contains six 1-oz. squat grease jars. Plenty of room for literature and order blanks.

Less 10% for Cash

Other styles in our FREE Catalog

L-U-C-E

Builders of Sales Luggage

614 Delaware, KANSAS CITY, MO.

SOME SPEED

"National Petroleum" Mutual Fire Insurance Co.,

Dear Sirs:

We beg to acknowledge receipt of your check of $286.51 to cover fire loss under policy No. 21008.

We wish to state that this is the quickest and most satisfactory adjustment and settlement of a loss that we have ever had since our participation in the oil business.

Yours respectfully,

WEBB OIL CO.

(*Signed*) Jos. A. Kelly"

Fall River, Mass. Feb. 1st, 1930

Are *you* insured with

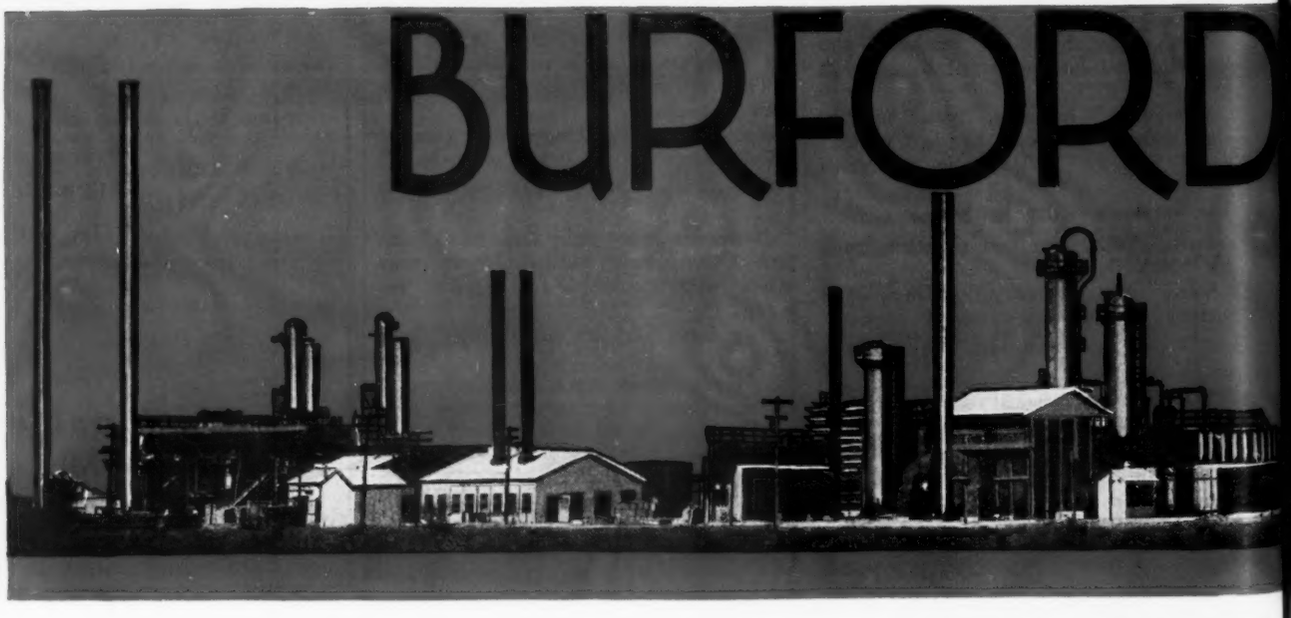
National

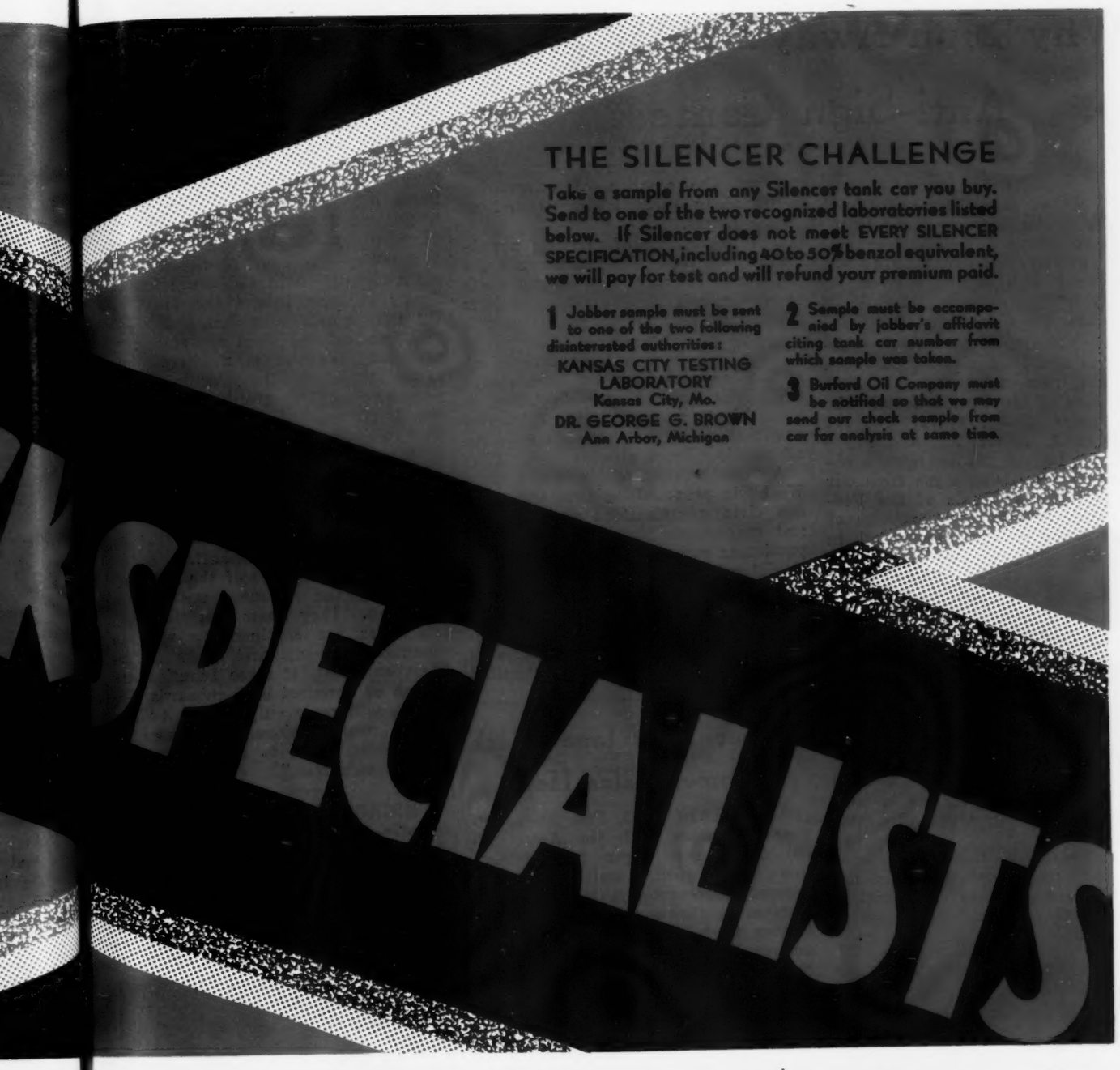
PETROLEUM MUTUAL

Fire Insurance Company

437 Chestnut St., Philadelphia, Pa.

ANTI-KNOCK
SILENCER
GASOLINE
SPECIFICATIONS
40-50% Benzol Equivalent . . . Good Benzol Odor . . . initial 90-100 . . . 10% off at 158 . . . 50% off at 282 . . . 90% off at 390 . . . end-point 400-410 . . . doctor, corrosion, sulphur and gum O.K. . . . color red.


BURFORD


THE SILENCER CHALLENGE
Take a sample from any Silencer tank car you buy. Send to one of the two recognized laboratories listed below. If Silencer does not meet EVERY SILENCER SPECIFICATION, including 40 to 50% benzol equivalent, we will pay for test and will refund your premium paid.
1 Jobber sample must be sent to one of the two following disinterested authorities:
KANSAS CITY TESTING LABORATORY
Kansas City, Mo.
DR. GEORGE G. BROWN
Ann Arbor, Michigan
2 Sample must be accompanied by jobber's affidavit citing tank car number from which sample was taken.
3 Burford Oil Company must be notified so that we may send our check sample from car for analysis at same time.
SPECIALISTS

OIL COMPANY
General Sales Office,
TULSA TRUST BLDG.,
TULSA, OKLA.
Refinery, PECOS, TEXAS
Branch Sales Office, Plymouth, Bldg.,
MINNEAPOLIS, MINNESOTA

"Why 'Sign' Away Beauty" Wins Anti-Sign Contest

LOS ANGELES

"WHY 'Sign' Away Beauty?" is the winning slogan in the "Scenic or Sign-ic?" contest sponsored by the Standard Oil Co. of California, as part of a nation-wide effort to beautify our countryside and make it more attractive to motorists.

Nearly 27,000 slogans were submitted in this local contest, in which the prize winners were drawn from all sections of the Pacific Coast. The major prize of $1000 was awarded to Alwyn J. Baker for a plan to coordinate the efforts to remove objectionable advertising signs from our highways. Two officials of the Federal Forest Service were winners of prizes for other plans submitted in the contest.

Prizes also were awarded for the best essay on the reasons for removing advertising signs that deface the landscape, and for the best photographs showing actual defacement of scenic views by ugly billboards.

All the plans, photographs, and suggestions submitted by contestants will be placed in the hands of experts for analysis and for eventual submission to public and private agencies that are cooperating in plans to keep outdoor advertising within desirable limits.

Suggestions submitted in the contest include recommendations that national, state and county organizations be formed as part of a campaign to prevent the erection of advertising signs along rural highways and at scenic points.

The importance of creating a public opinion that will not tolerate the present defacement of beauty spots is recognized, and the proposal is made that popular education on this subject should begin in the public schools, and be continued throughout the other activities of community life. The general attitude taken is that this is a community affair, and one that calls for united action by all public-spirited citizens.

A "Conservation of Natural Beauty Week" is proposed, so that the various civic organizations can combine and concentrate their efforts on this particular period, which it is planned, should end on May Day, or some other appropriate day.

That all citizens—business men and private individuals alike—have an interest in this beautifying campaign is stressed in the essays submitted in the contest. The value of the motor-tourist caravan trade is estimated to exceed three billion dollars a year, and practically all trades and industries share in the benefits of this outlay. Service-station owners and operators have a particular interest in fostering this tourist traffic for they are among the first to benefit by an increase in the use of our highways, and they quickly feel the loss of profits when travel decreases for any reason.

Public opinion in California is evidently strongly behind the Standard Oil Co. in this campaign, for sentiment against any form of defacement of scenic beauties is nowhere more active than on the Pacific Coast, where scenery is counted as among the important assets of the state. The campaign also has the approval of other oil companies, because it is in harmony with the efforts so many of them are making to promote tourist traffic.

Whether they have retail outlets or not, oil company executives recognize that all branches of the industry benefit by the increased use of the highways. They know that the tourists cross the continent to see the mountains, forests, and parks of the West and that, if these beauties are hidden or obscured by signboards, the tourist will come only once. As one of the winning slogans expresses it, the tourists come to see "landmarks —not trademarks."

Former Pipe Line Clerk Becomes Sales Head

SAN FRANCISCO, Feb. 20.—A 20-year connection with the Associated Oil Co., which began in the pipe line department and progressed through representation in the Orient, resulted in the appointment of B. I. Graves to general sales manager, as announced in the Dec. 25 issue of NATIONAL PETROLEUM NEWS, page 126.

Mr. Graves began as assistant chief clerk in the pipe line department, later filling various positions in the auditing, personnel and sales departments. In 1922 he was sent to China as general representative in the Orient for the company. Four years later he was made assistant to the vice president in charge of sales, and since that time he has been in charge of sales work, becoming manager of fuel oil cargo and export sales in 1928.

P. E. Allan, who was appointed manager of domestic sales, with supervision over the advertising department, has been with the company 15 years. His first job was with the accounting department, later being transferred to the Avon refinery and then to the sales department. In 1925 he became assistant sales manager which he has been up to his recent promotion.

F. M. Rowles, who was formerly domestic sales manager of white oils and lubricating oils, has resigned to devote his time to activities outside the oil industry.

CHICAGO, Feb. 21.—A. H. Eisler, recently with the Standard Fuel & Furnace Co., is now connected with the American Petroleum Co., 310 So. Michigan Ave., Chicago. Mr. Eisler was with the American Co. before the Standard.

B. I. Graves
recently appointed general sales manager of the Associated Oil Co., San Francisco

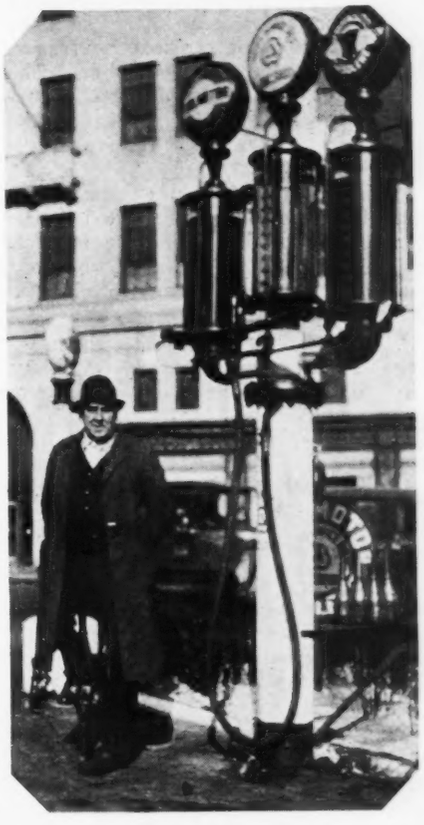
P. E. Allan
who became manager of domestic sales for the Associated Oil Co., San Francisco, recently

ADVERTISING PAGES REMOVED

The front end of the station, the gasoline drives and the office. Lubrication and car washing is done in the building, part of which shows at the rear, and 40 to 50 jobs can be turned out in a day

$500 a Year Keeps Up Tickler System on Lubrication Customers

By E. L. Barringer
N. P. N. STAFF WRITER



A. P. Schultz
He operates a service station in the business district of Toledo

A. P. SCHULTZ operates just one station, in the business district of Toledo, a block back of the leading hotels. He has a one-story building where he lubricates and washes autos, sells and charges batteries, and an office and accessory storage space. On the corner is a small plot for a drive with two gasoline pumps.

His merchandising efforts take three directions. He stocks the gasolines and motor oils wanted by his customers. He keeps a record of all customers, excepting those buying gasoline only, and follows up with an invitation to return. He advertises, by direct mail, and in publications, for the benefit of motorists not patronizing his station.

For instance, Mr. Schultz sells Johnson's Ethyl, and Cities Service Koolmotor and regular gasolines. Here is the way he decided on the brands.

"I figured that Ethyl gasoline would be a good item to sell. It has a lot of national advertising behind it, and I thought there ought to be a good demand for it. Then I figured that some Cities Service gasoline would go good here too. You see there are about 12,000 persons in Toledo owning some Cities Service stock. Then there are from 1000 to 1500 employes of the company here. Doherty interests own the electric light and street railway companies as well as some other plants."

Eight brands of motor oil are stocked, and Mr. Schultz is adding the ninth. He sells Quaker State, Mona Motor, Oak, Pennzoil, Mobiloil, Cities Service, Texaco, and Shure Oil, his own brand. Arrangements are being made to sell Veedol.

"I have a station on this corner and I'm willing to sell whatever kind of motor oil my customers want," said Mr. Schultz.

To obtain the future business of his lubrication customers Mr. Schultz sends out reminders by using a visible card filing system. Each unit of the system has eight trays, and each tray contains 48 cards. Mr. Schultz

uses six units, and files his cards according to make of automobile, then by license number.

The first step in the system is to transfer the information contained on the shop work ticket to the customer's card in the file. Each cross line on the card is sufficient for recording the work done in one call—date, speedometer reading, number of attendant doing the work, various lubricants purchased, total amount of sale, when reminder card was sent, and remarks. The space for when reminder was sent allows Mr. Schultz to check on whether the work is being done.

The visible edge of the card is a quarter inch deep. This space shows the license number on the left. The remaining space is divided into 24 sections, two for each month, and here is recorded the date when the reminder is to be sent. Thus, the first section, for the first half of January, will contain the dates on which reminders are to be sent, to customers who patronized the station in the first half of December. The office boy can glance down the current section, and quickly take off the customers who are to receive a reminder.

Thirty days after a customer has been in, if he has not returned in the meantime, the first reminder is sent. This is a penny post card with two messages; one to the automobile, the other to the owner.

"Dear (make of car)" so the message to the auto begins. "Thirty days ago you were a guest in our service station. At that time your speedometer reading was ..... How are you feeling? Any squeaks or groans? Why don't you bring your driver over today and let us look you over—we'll give you quick service."

The other half of the card carries the conventional reminder that the motor oil, transmission, differential, or chassis needs attention. It is addressed to the car owner.

A second reminder is mailed 60 days after the visit, if the customer has not returned. This card reminds the driver that it has been 60 days since he was in. It also reminds him that if the service was not satisfactory the station will be pleased to have his criticism. A return card is attached.

Mr. Schultz estimates that the upkeep of the system is about $500 a year. A high school boy comes in after school hours, and on Saturdays, to look after the filing and mailing, and to do odd jobs around the station. The major portion of his wage, $10 a week, is charged to the system, and constitutes the major expense of upkeep.

Mr. Schultz used the system first in 1929, and filed all customers. This year he plans to file only customers who have come in two or more times. All work tickets from the shop now are kept in a cardboard box. When the customer's second work ticket comes to the office he is entered then on the filing system.

In going over the 1929 cards he found that many were one-time customers, thus cluttering up the files. Also, there were a large number who patronized the station over the winter. Mr. Schultz believes he got this business through having enclosed pits.

On the other hand Mr. Schultz found he had many customers who were regular patrons over the year.

Stores Trucks Nights

A. P. Schultz, who operates a one-stop station at Toledo, O., has some room for car storage at his station, but it is not pushed during the daytime because of the need for a place to leave cars which have been washed and lubricated and are waiting for their owners to call for them.

Nights, however, Mr. Schultz houses a fleet of four trucks for a company in his neighborhood and thus takes in some revenue for space that would otherwise be idle. He services these trucks also, which helps carry the overhead of the station being open 24 hours a day.

The prize customer is a salesman who leaves his car at 8:30 o'clock every Monday morning, calls at his office for his mail, and returns for his car. He drives about 500 miles a week, and has all lubrication work done at the station.

In addition to bringing in a good revenue this customer is highly prized by Mr. Schultz as proving his theory that lubrication pays. Several years ago this salesman turned in a car driven 30,000 miles, and it had been lubricated every week. The service manager at the garage taking in the car bought it for his personal use on account of its excellent condition.

The biggest problem in operating this follow-up system is obtaining the name and address of the customer, in such a manner that the regular patron will not be asked repeatedly. At present Mr. Schultz is having his attendants ask the name when filling in the work ticket. The license number of course is taken. Addresses are obtained from the telephone book or city directory.

Several methods have been tried out by Mr. Schultz. At one time he gave an inexpensive key container, and had the customer fill out a card with his name and address. Presumably this information was wanted so that if a lost container was returned to the station the owner could be notified. The containers carried Mr. Schultz' advertisement and were numbered. This method did not work out as too much time was required of attendants to get the information.

Another source of information used was a set of books listing all auto registrations in Ohio. He cooperated with two other automotive service places so the cost, $48 for the set, was split three ways. Now a list of registrations in Lucas county only costs $150. Mr. Schultz has used the local license bureau, and the auto club records, but found these methods also taking much time.

To sell his station to the potential customers Mr. Schultz uses direct mail and publications. Each week he uses space on an industrial page of a local daily newspaper. Programs and booklets published by schools, fraternal orders and others are used by Mr. Schultz. He sent out a letter on winter driving needs recently to a list of lawyers, doctors, and dentists in Toledo, but did not get a nibble.

Although he is starting his eleventh year in business on the present site Mr. Schultz said he did not know how he could improve the layout. The building on the rear of the lot, 60 feet square, will store 28 automobiles, and has turned out 40 to 50 lubrication jobs a day.

The handling of automobiles in the building is facilitated by a turn table inside the entrance door. This door opens on the drive in front of the station; the exit door opens on the side street. From the turn table autos are directed on the lubrication or wash pits.

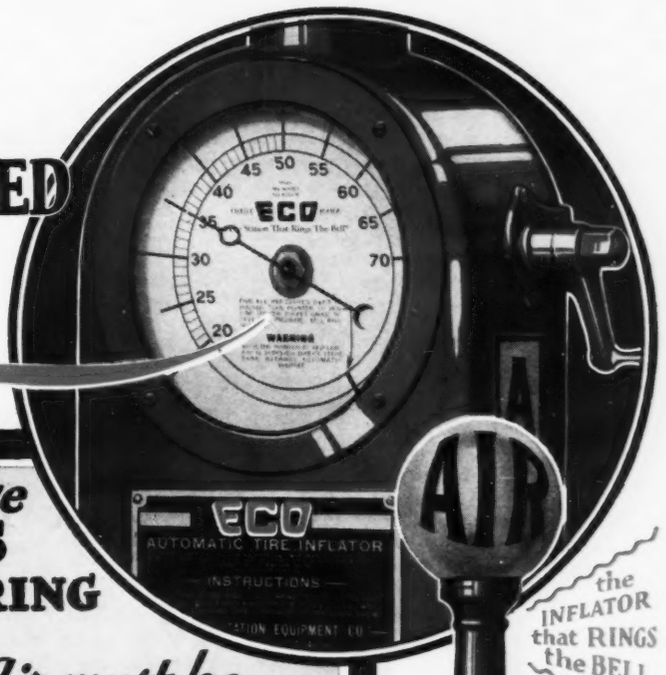
On one side of the entrance, back of the office, are two lubrication pits. The channel irons almost touch at the turn table, but are about six feet apart at the opposite end. On the other side of the table is the wash pit.

When a job is complete the auto is backed onto the table, and with a quarter turn the car can be moved to any part of the building. The car can be headed for the entrance doors to leave, or to be backed into a storage space; or it can be turned to the rear of the building for leaving by the exit doors. With a half turn a car can be moved from the lubrication to the wash pits.

Greases and most of the oils are stored along the lubrication pit walls. The oil rack, on the floor level side of the pits, has 14 spigots. Beneath the rack are 10 grades, in eight 110-gallon drums and in two 55-gallon drums. Air pressure moves the oil. Under the room are four drums, and oil is moved from them by gravity.

At the head of the pits are drums for storing seven grades of grease—chassis, stearing gear, water pump, universal joint, wheel bearings, transmission, and differential. Attendants working in the pit have air pressure equipment. Those working on the floor level use hand operated high

Why AIR MUST BE MEASURED Automatically



Positive Delivery of Precise Pressure DEMANDS AUTOMATIC MEASURING

Measuring air by hand is not the American way of doing things. It's too slow—too troublesome—too inaccurate. Insistence upon speed and accuracy demands automatic inflation.

There is one sure way to give millions of car owners what they want — ECO TIREFLATOR. Automatically it delivers the precise pressure that the tire manufacturers recommend. No guesswork; no fuss. Rapid, convenient, absolutely accurate. Millions are demanding ECO TIREFLATOR service—precise pressure, automatically delivered.

Service Station Equipment Company

"Bennett" — "Eco" — "John Wood" Products; Everything for Filling Stations

ATLANTA— 101 Marietta Street Bldg.
BALTIMORE— 507 American Bldg.
CALGARY— 605 Eleventh Ave., W.
CHICAGO— 910 S. Michigan Blvd.
CLEVELAND— 5305 Sweeney Ave.
DALLAS— 2216 S. Harwood St.
DENVER— 203 Continental Oil Bldg.
LOS ANGELES— 2146 E. 25th St.
NEW YORK— 32 Broadway
EMERYVILLE, CALIF.— Rheem Mfg. Co.
ST. LOUIS— 1405 Ambassador Bldg.
TORONTO— 101 Hanson St.
VANCOUVER, B. C.— 824 Hornby St.
WINNIPEG— 272 Fort St.

BENNETT EXPORT CORPORATION,
32 Broadway, New York City
(Branch Offices and Warehouses in Other Principal Cities)
Main Office: 4435 S. Western Blvd., Chicago Ill.

Air must be measured Accurately Automatically

—and let us add that next in importance to accurately measured air is clean, pure air. ECO TIREFLATOR filters the air. No impurities can get into tires. Car owners like ECO TIREFLATOR because it is so easy to operate. A turn of the handle and the dial is set. If it says 35 pounds, it means exactly that. The bell rings while air is being measured out. It stops automatically as soon as exact pressure has been delivered. An automatic, self-winding reel returns the hose to its protective housing.

Write for "TIREFLATOR" Bulletin

The station that rings the bell — symbol of complete and perfect air service.

Order from Your Jobber

Precision Made ECO Automotive Servicing Equipment

pressure equipment. All transmission and differential grease is metered.

Mr. Schultz has worked out several labor saving devices for his pits. Automobiles on which it is difficult to lubricate the stearing gear are hoisted from the front. This is done with a block and tackle on a monorail at the head of the pits. When a workman calls out "Get the hook" he is not thinking of the theatrical meaning. He is merely calling for the hook to pull up the front end.

On the car washing pit there are two rollers in each channel iron on which the rear wheels rest. The workman can turn the wheels without moving the car. For the front wheels Mr. Schultz has worked up a jack on a platform so the car can be raised.

Mr. Schultz was an early advocate of making a lubrication charge based on the number of fittings. His prices range from $1.25 to $2; most cars coming in the $1.25 and $1.50 class. For car washing he gets $1.75 and $2. Other departments at the station are storage, tire repairing, batteries, and accessories. The storage business is not being pushed on account of limited space. Many customers want to have the car lubricated or washed, then left for a few hours while shopping or going to the office. This extra demand prevents Mr. Schultz from renting much space for day storage. At night he houses a fleet of four trucks and services them, which helps carry the overhead of being open 24 hours a day.

The tire department does repairing and sells inner tubes. Casings are not sold at the station. Batteries are charged at a cost of $1.25, rental for two days is 50 cents and charging is 75 cents, but no repairing is done.

A full line of replacement accessories is stocked in the front office. The best item is fan belts, sold on the pits.

Mr. Schultz entered the oil business through the route taken by many men—he was a garage mechanic.

"Climbing around under cars showed me that many autos were not getting the proper lubrication," he said. "I got into business and opened a little place, a garage with a pit, near the business district. A year later, in 1919, two salesmen, one for an equipment house and the other for an oil company, induced me to move to this corner, and now the business district has grown right around me.

"Soon after I opened up here a printing house salesman came around and sold me some direct mail literature that really set me up. He had lots of ideas, and could work them out over night. I believe he went out to Jack Nourse's place later and did some work for him.

"He began talking 5000 envelopes, 5000 letterheads and 5000 something else. Then he got down to dollars and it was $295 for this and $175 for that and so on. Well, that took me off my feet as the most I'd spent for printing before was $25. I know his house, it was reliable, so I plunged. And it was the best thing I've done. He got results right away. I'm still using his slogan 'Business Is In-Greasing' and he called me Shure-Schultz the Oil Man. I'm still using that."

Another tie-up of the station with billboard and publication advertising is the drawing of a man with a sandwich board representing a five gallon oil can. In his hand he is holding a measure.

For further identification of his station Mr. Schultz makes his street number, 601, fit in with his oil change stickers.

"The motor car manufacturers used to recommend an oil change every 500 miles. I thought my goods was so much better that I tacked on 100 mores miles, then another mile for good luck. That gave me 601 miles, and change your oil, the same number as my street address," he said.

Waverly Builds Enclosed Pits At Pittsburgh Stations

PITTSBURGH

WAVERLY OIL WORKS CO. is going in for complete lubrication service with enclosed pits. The first station, with one pit, is completed; the second station, with two pits, is open for business, and the final touches are being put on the building.

Both stations are built along the same general lines. Both are of red tapestry face brick, with interior walls cemented. The building faces are parallel with the street, set back in the center of the lot.

At one end of the building are the pits and at the other end the attendant's and rest rooms. At the first station the air compressor is placed back of the attendant's room, while in the newer station this space is used for drum oil storage.

The pits have channel iron drives. At the second station the two pits are in the cellar of what was a brewery in by-gone days, and the space under the pits is all open. Lamps in reflectors along both sides of the pits provide light. The air compressor at the two pit station is along the wall in the pit. Both stations have overhead doors in the pit rooms.

Costs $115 Per Year to Feed Motor Car

RICHMOND, Va.—Every car owner in the District of Columbia spent an average of $115 for his gasoline and oil in 1929, according to the manager of the District of Columbia Automobile Association.

Total amount of money expended by motorists for their gasoline and lubricant purchases in the District of Columbia was $15,685,000 during the past year.

Stevens Grease Elects Officers

CLEVELAND, Feb. 11.—At a directors' meeting of the Stevens Grease & Oil Co. with headquarters here, these officers were elected for the ensuing year:

W. T. Ross, president; A. Roy Allison, vice president; and H. A. Lewis, secretary and treasurer.

Mr. Allison will have charge of sales and manufacturing.

A new station of the Waverly Oil Works Co. in Pittsburgh with two enclosed pits. The station is open for business but all signs have not been erected

PURCHASING AGENTS—CHECK YOUR REQUIREMENTS WITH THE *Rheem*

5 GALLON DELIVERY BUCKET

★PRECISION EQUIPMENT

Look at this Bucket in terms of your own requirements. Compare it, point by point, with the things you demand of your side rack buckets.

Low price alone is not enough. The Rheem Bucket is low priced, but far more important is its long service life free from trouble. Unusually heavy steel construction, hot dipped after fabrication, guarantees wear-ability, earns re-orders from major oil companies.

Clean deliveries of gasoline and oil save mess, save money. The dished, radially embossed bottom stops volume creeping, keeps all liquid inside till the delivery is made. No jammed caps, no broken threads with the indestructible Rheem cam-action cap. Less than a quarter turn locks it against the leak-proof gasket. Try a "test number" of Rheem Buckets, then check up on your investment and replacement expense.

ALL RHEEM DELIVERY BUCKETS ARE *hot dipped* AFTER FABRICATION

Below, you see the heavily dished, radially embossed bottom. It ends volume creeping. The heavy construction, the corrugations where hard knocks come, the 12 gauge chime ring around the bottom double seam mean years of service.

The picture shows the cam-action cap . . . no threads to jam or break. (Pat. 1696388, others pending). The crimped bail fits the hand naturally, allows ample hand clearance.

» » » » SEND FOR INFORMATION

Let us send you complete specifications and prices. Production facilities permit alterations to meet your special requirements. Supplied in quantity without delay from our warehouses in Emeryville, Seattle and Los Angeles. » » Fill in the coupon, or write us.

TEAR HERE « FILL IN » MAIL

RHEEM MANUFACTURING COMPANY
4535 Horton St., Emeryville, Calif.

Send complete information and prices on RHEEM 5 GALLON DELIVERY BUCKETS

Name

St. Address

City State

RHEEM MANUFACTURING CO.

4535 HORTON STREET - EMERYVILLE - CALIFORNIA

LOS ANGELES: 1001 East First Street SEATTLE: 1518 First Avenue, South

The bulk plant at Pomona, Calif., of the Rio Grande Oil Co. with floating roofs on storage tanks protected by umbrellas

Umbrella Protects Floating Roof On Bulk Plant Tanks

LOS ANGELES

FLOATING roofs, protected by umbrellas, are installed on upright storage tanks at the Pomona, Calif., bulk plant of the Rio Grande Oil Co.

The umbrellas are stationary, and protect against the weather. The diameter of the tanks was too small to allow the drainage device on the Gallagher floating roof to operate so the umbrella was devised to keep water off the roof head.

Important features of the Gallagher floating roof are the reduction of evaporation losses, internal evaporation or "gassing," and fire protection. The roof floats on the liquid level, eliminating an air chamber between the roof and the level of the liquid.

The picture above is a general view of the Pomona bulk plant, with the umbrella roof tanks in the center. The plant is enclosed with a stout fence. The yard is free of rubbish or weeds, and all the buildings and tanks are painted.

The tank truck loading rack and the warehouse loading platform are so arranged in the plant for the least amount of travel for trucks to load. A truck can enter the plant, load at the rack or the warehouse, without interfering with work at the other rack.

The locations also allow a truck to fill at the rack and in circling the drive on leaving can stop at the warehouse. The truck garage is back of the refined oil loading rack so a truck can be filled on the way out in the morning without excess driving.

House Organ Entirely In Pictures

LOS ANGELES—The January number of the "Rio Grande Review," publication of the Rio Grande Oil Co. here, emerges in sepia covers, presenting its news content entirely in pictures. This pictorial review takes in the various branches of the company's activities, beginning with a picture of the company's first producing well, brought in Jan. 10, 1920 up to the fueling of the tri-motored Fokker airplane "Rio Grande" in 1929.

Pictures of the management, which includes five of the Lockhart family in executive positions, and three others: F. H. Etheride, M. C. Brush and Frank A. Morgan, lead off the pictorial section.

A new tank car of the Lion Oil Refining Co., El Dorado, Ark. It is painted in aluminum with decalcomania signs of orange and black, the company color scheme. The lettering of Lion Oils is in orange. The company operates some 700 tank cars

Firestone Is Advertising One-Stops Nationally

CLEVELAND, Feb. 20.—Firestone Tire & Rubber Co., Akron, O., has developed its one-stop service stations to a point where it has begun national advertisement of one-stop service in magazines and on the radio.

A double-page color advertisement in the current issue of Time features tires, rims, batteries and brake lining, all Firestone products. In a sign atop a one-stop service station which is pictured in the advertisement, gasoline, oil and greasing are mentioned.

The text of the Time advertisement reads:

"Now you can drive your car to one station—make one stop instead of many and secure everything your car needs—tires, batteries, brake testing and relining, etc., all taken care of at the same place. That's Firestone One-Stop Service—the greatest step forward ever taken for saving time, money and worry for car owners. Just what you have always wanted—and now ready for you at leading Firestone dealers' stations from coast to coast. It is new—different—a revelation. It provides the most complete, most economical and most practical service for keeping your car in proper condition at all times."

COLUMBIAN

—that's all you have to specify when contemplating the purchase of dependable oil handling equipment. No matter where you are, or what your conditions of Use, Space or Appropriation—there is a COLUMBIAN product of the correct type, size and variation to meet your every requirements.

Detailed information and catalogs are yours for the asking.

PIONEERS

COLUMBIAN STEEL TANK COMPANY

EST'D 1894

TANKS FOR THE WORLD

1405-1625 WEST 12TH STREET KANSAS CITY, MISSOURI

BRANCH OFFICES

30 Church St., New York
564 Market St., San Francisco
408 Chamber of Commerce Bldg., Denver

DISTRIBUTORS:

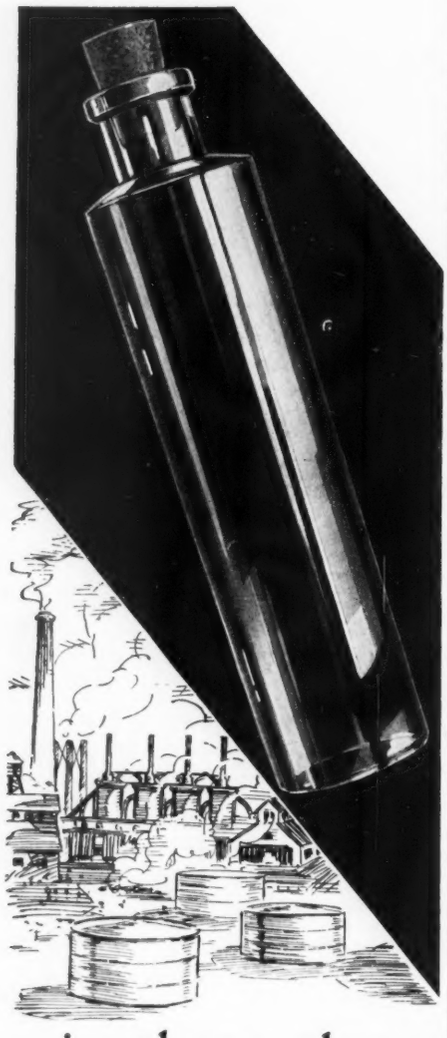
Herman Body Co,. St. Louis
Truck Engineering Co., Cleveland
William Ford & Co., Detroit, Flint and Toledo
The Schnabel Co., Pittsburgh
Truck Equipment Co., Buffalo
Perin-Walsh Co., Boston
Interboro Hoist & Body Corp., Long Island City
Philadelphia Truck Equipment Co., Baltimore and Washington
Dixie Culvert & Metal Co., Atlanta and Jacksonville
The Equipment Co., Nashville
Leland Truck Equipment Co., Tulsa and Dallas
San Antonio Body Co., San Antonio
California Columbian Steel Tank Ltd., Los Angeles
Western Steel Products Co., Duluth
A. Y. McDonald Mfg. Co,, Omaha, Lincoln, Sioux City and Des Moines
General Supply Co., Mexico D. F. Mexico
Mexican Trading Corp., Tampico, Tamps., Mexico
Leopoldo Sol & Cia., 384 Cangallo, Buenos Aires, Argentina

Field Contact and Service in South America: P. H. HEENEY, Apartado, 298, Maracaibo, Venezuela

FOR SAFETY SPECIFY COLUMBIAN

Daily Average Crude Oil Production and Imports

Oil Samples make Sales



~in these clear, brilliant bottles

Your product is your best salesman, so make sure that it is dressed in the best possible way. Owens-Illinois sample oil bottles are hand-blown of the finest perfume-bottle glass to give the maximum in beauty and display.

Special attention is given to the necks of these beautiful bottles. They permit of perfect and uniform corkage.

For a slight extra charge you may have your trade-mark blown on each bottle. Obtainable in 2, 4 or 8 oz. sizes. Samples gladly sent upon request. Owens-Illinois Glass Company, Toledo, Ohio.

OWENS·ILLINOIS
BOTTLES

Aviation Pays Its Way With Continental Oil Co.

CLEVELAND, Feb. 21.—Under the caption "Aviation Pays Its Way" the Continental Oil Co., Ponca City, Okla. in a recent issue of its house organ, reveals its records on the cost of operating an airplane for company business. This company operates two planes, a Lockheed-Vega monoplane for the use of executives, and a Travel Air monoplane for use in aviation sales work.

Using the more costly Lockheed as its basis of figuring costs to insure a fair figure, the company arrived at $1336 as the cost of operation during last October. This figure includes pilot's and mechanics salaries, gasoline, oil, depreciation, repairs, insurance, and all expenses incidental to the maintenance of the plane. The plane was in the air 48 hours during that month and covered 5704 miles at an average cost of $28.10 per hour, or 23.42 cents per mile.

Believing that times saved is money saved, the company goes on to point out that the airplane saved some 15 days of executives' time during October, worth about $1400 to the company. Last summer when officials made a tour of company properties by bus, covering about the same distance which the Lockheed covered during October, the bus trip required 18 days' traveling and working 15 hours a day. This was even a better average than would have been possible by rail, the company says, because of indirect routings and lay-over schedules necessitated by railroads.

Added to this expense are meals, hotel, pullman and other items incidental to traveling by rail or automobile.

The production department finds the greatest value in the airplane, the Continental says, because of the necessity of maintaining close supervision over properties in Canada, California, Mexico and Texas. Any of these fields can be reached by airplane in not more than 15 hours, as compared to three or four days by rail.

The article cites two occasions when the Lockheed was used to prevent delays that would have meant the loss of thousands of dollars in crude oil and gas and might have resulted in heavy destruction of property.

One was when a 5000-barrel oil well, which also was making 120,000,000 feet of gas, went on a rampage in California. E. J. Nicklos, vice president in charge of production, flew to California to help supervise the capping of the well, and it was brought under control in 17 days, establishing a record for this work.

The other was when a well near Garber, Okla., making 15,000,000 feet of gas caught fire. It was near another well with an open flow of 50,000,000 feet of gas, which might ignite at any time. A well shooter had to be procured in a hurry so the Continental plane was dispatched for M. M. Kinley at Tulsa, with the result that the fire was extinguished four hours after the airplane left the Ponca City headquarters of the company.

A recent sales promotion campaign for Conoco Germ processed motor oils, an all-day meeting and a night meeting were held at each of the 12 division points in the company's marketing territory. By use of the Travel Air plane, it was possible to make the entire tour in only 21 days, whereas such a series of meetings would have required not less than six weeks, covering the same territory by rail. The distance covered was more than 5000 miles. This plane effected a saving of about $2000 for the sales promotion tour.

Comparing the continental's airplane operation costs with those of the Texas Pacific Coal & Oil Co., furnished on its four-passenger Stinson-Detroiter, Jr., and Ryan brougham in an article published Aug. 28, 1929 in NATIONAL PETROLEUM NEWS, we have these figures merely as a comparison:

	Continental Oil	Texas Pacific
Per hour cost	$28.10	$38.15
Cents per mile cost	23.42	37.50
Miles flown	5704	15,162
Hours in air	47.53	149

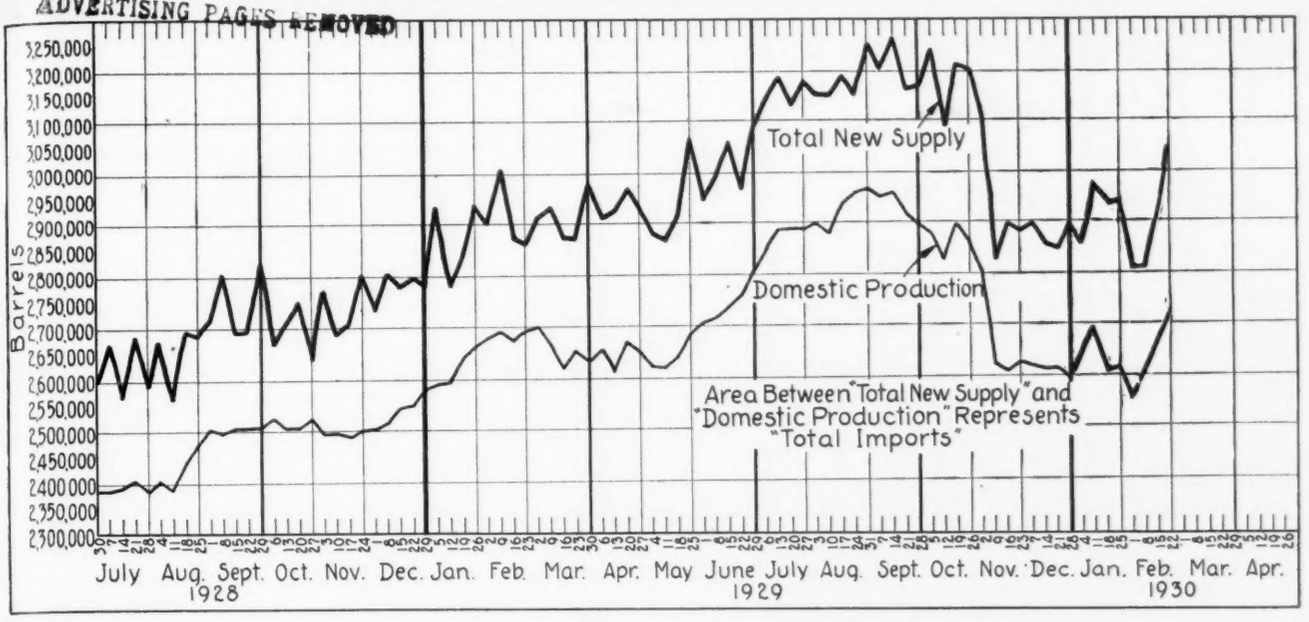
Another company, the Independent Oil & Gas Co., Tulsa, has figured that the costs of operating its Lockheed plane is 32 cents per mile, including expense of its aviation department, as compared with six cents per mile for automobiles.

New Connersville Officials Named

CLEVELAND, Feb. 19.—At a recent meeting of the board of directors of The Connersville Blower Co. Inc., Connersville, Ind., John T. Wilkin, president and chief engineer, was chosen as general manager, also. At the same time, Bernard C. O'Brien, formerly in charge of sales in Pittsburgh, was elected secretary; W. E. Newkirk, purchasing agent, became treasurer, and E. C. Hassler, assistant superintendent, was appointed acting superintendent. The last three selections were to fill vacancies due to the deaths of J. E. Huston, secretary-treasurer, and R. T. Huston, vice president and superintendent.

ADVERTISING PAGES REMOVED

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below as compiled by American Petroleum Institute

PRODUCTION SUMMARY	Feb. 22	Feb. 15
Production east of Rockies	1,916,050	1,901,950
Increase		14,100
Total production in U. S.	2,722,050	2,652,950
Increase		69,100
Crude oil imports	327,715	255,430
Increase		72,285
Total crude supply	3,049,765	2,908,380
Increase		141,385

OKLAHOMA	Feb. 22	Feb. 15
Allen Dome	20,150	23,400
Asher	2,350	2,500
Blackwell	3,100	3,450
Bowlegs	21,100	22,850
Braman	3,650	3,600
Bristow-Slick	16,800	17,400
Burbank	16,600	16,100
Carr City	8,250	9,050
Cromwell	7,300	7,300
Cushing	14,400	14,200
Davenport	1,200	1,250
Duncan District	7,850	8,450
Earlsboro	32,750	32,200
East Earlsboro	47,050	31,650
Fox	1,250	1,250
Garber	4,500	4,650
Graham	3,700	3,700
Healdton	11,950	12,000
Hewitt	7,450	7,400
Hubbard	1,500	1,700
Little River	47,800	47,150
Little River, East	19,800	17,000
Logan County	10,500	11,200
Maud	6,050	5.650
Mission	14,600	15,200
North Okmulgee	11,250	11,300
Oklahoma City	88,550	86,750
Osage (Outside Burbank)	26,350	26,450
Papoose	2,850	2,850
Pearson	750	700
Sasakwa	8,900	9,550
St. Louis	44,350	42,750
Scholem-Alechem	13,800	13,750
Searight	8,200	8,200
Seminole	21,650	22,200
Seminole, East	4,100	4,300
South Okmulgee	6,250	6,300
Thomas	500	550
Tonkawa	8,350	8,500
Wewoka	4,100	4,100
Yale-Jennings	8,000	8,750
Others	57,200	55,400
Total, Oklahoma	646,800	632,700
Increase		14,100

KANSAS		
Augusta-Fox Bush	2,900	2,900
Churchill	4,550	4,750
Eldorado-Towanda	13,400	13,130
Florence-Covert	850	900
Greenwood County	19,600	20,500
Oxford	2,900	3,000
Peabody-Elbing	3,150	3,050
Rainbow Bend	1,100	1,100
Russell	3,300	3,300
Sedgwick County	23,250	23,450
Others	35,600	34,400
Total, Kansas	110,600	110,500
Increase		100

NORTH LOUISIANA		
Bellevue	600	600
Caddo, light	10,150	10,000
Caddo, heavy	2,700	2,800
Cotton Valley	2,100	2,100
De Soto & Red River	3,150	2,300
Elm Grove	450	450
Haynesvlile	4,550	4,600
Homer	3,550	3,600
Pleasant Hill	750	900
Urania	5,100	5,150
Zwolle	5,300	3,650
Others	3,300	1,400
Total, North Louisiana	41,700	37,550
Increase		4,150

ARKANSAS		
Champagnolle	4,200	4,400
El Dorado	4,050	4,100
Lisbon	1,050	1,050
Nevada	1,100	1,100
Smackover, light	5,150	5,200
Smackover, heavy	41,400	41,300
Stephens	950	1,000
Others	250	250
Total, Arkansas	58,150	58,400
Decrease		250

TEXAS (Outside Gulf Coast)		
Panhandle District		
Carson County	9,900	9,600
	Feb. 22	Feb. 15
Gray County	52,600	54,800
Hutchinson County	25,300	24,150
Wheeler County	600	550
Others	600	600
Total, Panhandle Texas	89,000	89,700
Decrease		700
North Texas		
Archer County	17,400	17,550
Burkburnett	8,200	8,200
Electra	11,450	11,500
Iowa Park and K. M. A.	5,100	5,150
Montague-Cooke	11,150	11,200
Wilbarger	26,000	25,700
Others	1,700	1,600
Total, North Texas	81,000	80,900
Increase		100
West Central Texas		
Brown County	8,750	8,800
Callahan County	3,300	3,300
Coleman County	5,500	5,550
Eastland-Desdemona	5,900	6,000
Jack County	4,500	4,600
Palo Pinto County	650	650
Shackleford County	9,000	9,200
Stephens County	5,300	5,400
Throckmorton County	700	750
Young County	8,100	8,200
Others	1,350	1,400
Total, West Central Texas	53,050	53,850
Decrease		800
West Texas		
Crane and Upton Counties	45,350	45,500
Crockett County	2,200	2,100
Howard County	36,700	37,800
Jones County	2,100	2,200
Mitchell and Scurry Counties	2,400	2,300
Reagan County	16,750	16,900
Winkler County	91,200	89,500
Yates	133,800	129,500
Balance Pecos County	6,200	6,800
Others	4,000	3,800
Total, West Texas	340,700	336,400
Increase		4,300
East Central Texas		
Boggy Creek	3,400	3,400
Corsicana-Powell	5,950	5,800
Currie	350	400
Mexia	4,450	4,750
Nigger Creek	200	250
Richland	250	250
Van Zandt	8,100	8,000
Wortham	900	900
Total, East Central Texas	23,600	23,750
Decrease		150
Southwest Texas		
Dale	300	300
Darst Creek	17,000	17,450
Laredo District	8,800	8,750
Luling	10,300	10,400
Lytton Springs	900	900
Salt Flat	25,300	25,950
Somerset	1,450	1,550
Others	2,700	2,850
Total, Southwest Texas	66,750	68,150
Decrease		1,400
Total, Texas (Outside Gulf Coast)	654,100	652,750
Increase		1,350

GULF COAST		
Coastal Texas		
Barbers Hill	23,500	24,200
Batson	1,200	1,100
Big Creek	3,600	4,000
Blue Ridge	1,800	1,800
Boling	1,100	1,050
Damon Mound	500	450
Fannett	1,200	1,300
Goose Creek	4,900	4,900
Hull	8,400	8,550
Humble	16,200	15,200
North Dayton	1,150	1,150
Orange County	2,500	2,500
Pierce Junction	11,300	10,700
Port Neches	1,650	1,700
Raccoon Bend	11,800	12,050
Refugio County	33,500	37,400
Saratoga	1,000	1,000
Somerville	1,500	1,650
Sour Lake	2,300	2,400
South Liberty	5,850	5,950
Spindletop	17,350	17,800
Sugarland	12,400	12,100
West Columbia	6,200	6,200
Others	4,100	3,700
Total, Coastal Texas	175,000	178,850
Decrease		3,850
Coastal Louisiana	Feb. 22	Feb. 15
East Hackberry	1,400	1,450
Old Hackberry	1,700	1,800
Edgerly	600	600
Evangeline	1,100	1,100
Lockport	3,050	3,000
Port Barre	3,500	.....
Sorrento Dome	100	100
Sulphur Dome	5,300	5,300
Vinton	4,250	4,250
Others	1,950	3,650
Total, Coastal Louisiana	22,950	21,250
Increase		1,700
Total, Gulf Coast	197,950	200,100
Decrease		2,150

ROCKY MOUNTAIN		
Wyoming		
Big Muddy	2,050	2,100
Elk Basin	750	700
Grass Creek	2,050	1,950
Labarge	2,050	2,150
Lance Creek	200	150
Lost Soldier	3,350	2,850
Oregon Basin	3,900	4,250
Rock River	2,300	2,300
Salt Creek	30,400	30,950
Others	2,150	2,700
Total, Wyoming	49,200	50,100
Decrease		900
Montana		
Cat Creek	1,250	1,200
Pondera	2,000	2,000
Sunburst	4,950	5,950
Others	50	50
Total, Montana	8,250	9,200
Decrease		950
Colorado		
Florence	650	1,000
Fort Collins	1,600	1,600
Moffat (Craig)	1,100	1,050
Others	1,500	1,600
Total, Colorado	4,850	5,250
Decrease		400
New Mexico		
Artesia	700	750
Balance Lea and Eddy Counties	6,800	6,700
Hogback	400	400
Rattlesnake	1,300	1,400
Table Mesa	100	100
Others	950	950
Total, New Mexico	10,250	10,300
Decrease		50
Total, Rocky Mountain	72,550	74,850
Decrease		2,300

CALIFORNIA		
Dominguez	10,500	10,500
Elwood-Goleta	37,500	59,500
Huntington Beach	41,000	41,000
Inglewood	22,000	22,000
Kettleman Hills	13,000	13,500
Long Beach	122,500	111,000
Midway-Sunset	77,000	78,500
Santa Fe Springs	221,000	170,000
Seal Beach	35,000	31,500
Ventura Avenue	65,000	52,000
Others	161,500	161,500
Total, California	806,000	751,000
Increase		55,000

EASTERN		
(Not including Michigan)	120,400	121,700
Decrease		1,300
MICHIGAN		
Mt. Pleasant	8,200	7,600
Muskegon	5,400	5,600
Saginaw	200	200
Total, Michigan	13,800	13,400
Increase		400

Compilation Of Mid-Continent Refinery Operations

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Mid-Continent Refinery Operations, Week Ended February 21 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	West Texas	North La.-Ark.	Total Week Ended Feb. 21
Plants Reporting	12	29	25	15	12	93
Da. Av. Cap. (Bbls.)	92,000	160,200	86,600	83,000	54,900	476,700
Da. Cracking Capacity	30,700	52,600	17,200	5,000	22,700	128,200
Da. Av. Crude Runs	60,729 + 14.3	109,444 + 1.6	73,996 + 11.5	43,692 + 21.5	58,974 + 9.1	346,835 + 9.3
Da. Av. Other Oils	7,635 + 28.9	8,724 +297.6	3,190 +102.3	1,704 — 5.0	1,967 — 21.0	23,220 + 66.1
GASOLINE—Gallons						
Stocks, Feb. 14	28,210,000	72,256,000	24,004,000	11,772,000	13,801,000	150,043,000
Prod. 2-14 to 2-21	10,318,000 + 9.9	17,388,000 + 9.0	10,136,000 + 17.0	4,373,000 + 3.8	5,501,000 + 0.3	47,716,000 + 9.2
Ship. 2-14 to 2-21	9,234,000 — 1.1	17,251,000 + 6.8	6,254,000 — 24.7	3,718,000 + 14.8	6,145,000 + 5.0	42,602,000 — 0.7
Stocks, Feb. 21	29,294,000 + 3.8	72,393,000 + 0.2	27,886,000 + 16.2	12,427,000 + 5.5	13,157,000 — 4.7	155,157,000 + 3.4
Ratio Sales to Prod.	89.5%	99.2%	61.7%	85.0%	111.7%	89.3%
KEROSENE—Gallons						
Stocks, Feb. 14	10,392,000	7,025,000	3,052,000	37,000	2,557,000	23,063,000
Prod. 2-14 to 2-21	1,932,000 + 31.4	2,384,000 + 5.5	1,622,000 + 5.7	17,000	482,000 — 23.5	6,437,000 + 9.2
Ship. 2-14 to 2-21	2,515,000 + 22.7	2,055,000 — 16.5	1,908,000 + 23.1	27,000 +575.0	643,000 +105.4	7,148,000 + 11.4
Stocks, Feb. 21	9,809,000 — 5.6	7,354,000 + 4.7	2,766,000 — 9.4	27,000 — 27.0	2,396,000 — 6.3	22,352,000 — 3.1
Ratio Sales to Prod.	130.1%	86.1%	117.6%	158.8%	133.4%	111.0%
STOVE DISTILLATE—Gallons						
Stocks, Feb. 14	2,368,000	4,475,000	772,000	110,000	110,000	7,835,000
Prod. 2-14 to 2-21	380,000 — 11.0	962,000 — 14.0	162,000 — 20.6	91,000 — 57.5	166,000 — 12.6	1,761,000 — 18.8
Ship. 2-14 to 2-21	402,000 — 23.0	957,000 + 4.4	172,000 — 27.1		183,000 + 15.1	1,714,000 — 19.2
Stocks, Feb. 21	2,346,000 — 0.9	4,480,000 + 0.1	762,000 — 1.2	201,000 + 82.7	93,000 — 15.5	7,882,000 + 0.6
Ratio Sales to Prod.	105.8%	99.5%	106.2%		110.2%	97.3%
GAS OIL—Gallons						
Stocks, Feb. 14	3,505,000	34,197,000	2,395,000	7,777,000	5,003,000	52,880,000
Prod. 2-14 to 2-21	1,462,000 + 23.2	2,743,000 + 38.7	793,000 + 30.4	222,000	2,774,000 — 36.2	7,550,000 + 41.2
Ship. 2-14 to 2-21	1,221,000 — 27.1	2,220,000 — 27.5	978,000 + 99.2	965,000 — 16.2	2,873,000 + 33.4	8,257,000 — 3.5
Stocks, Feb. 21	3,749,000 + 6.9	34,720,000 + 1.5	2,210,000 — 7.7	6,590,000 — 15.3	4,904,000 — 2.0	52,173,000 — 1.3
Ratio Sales to Prod.	83.5%	80.9%	123.3%		103.6%	109.4%
FUEL OIL—Gallons						
Stocks, Feb. 14	10,171,000	27,688,000	67,873,000	10,620,000	25,325,000	141,698,000
Prod. 2-14 to 2-21	5,221,000 + 4.3	8,042,000 + 11.0	9,323,000 + 14.9	6,896,000 + 25.6	6,153,000 + 13.3	35,685,000 +14.1
Ship. 2-14 to 2-21	4,609,000 — 4.2	7,103,000 + 18.4	9,276,000 + 4.7	6,168,000 — 15.0	6,442,000 + 12.5	33,645,000 + 2.9
Stocks, Feb. 21	10,783,000 + 6.0	28,680,000 + 3.6	67,940,000 + 0.05	11,348,000 + 6.9	24,987,000 — 1.3	143,738,000 + 1.4
Ratio Sales to Prod.	88.3%	87.7%	99.5%	89.4%	105.5%	94.3%

Gasoline Produced by Various Methods, Week Ended February 21

	Kansas	% of Total	Oklahoma	% of Total	North & Cent. Texas	% of Total	West Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	6,537,000	63.4	11,715,000	67.4	7,267,000	71.7	3,992,000	91.3	2,087,000	37.9	31,598,000	66.2
Cracked	2,988,000	29.0	4,436,000	25.5	1,979,000	19.5	105,000	2.4	2,693,000	49.0	12,202,000	25.6
Natural	793,000	7.6	1,237,000	7.1	890,000	8.8	275,000	6.3	721,000	13.1	3,916,000	8.2
Total	10,318,000		17,388,000		10,136,000		4,373,000		5,501,000		47,716,000	

+ or — columns are % change over previous week.

Mid-Continent Refiners Increase Crude Runs

Staff Special—By Telegraph
TULSA, Feb. 24

CRUDE charges were increased 29,500 barrels daily average in the week ended Feb. 21 at refineries reporting weekly to NATIONAL PETROLEUM NEWS. Each district except West Texas and Louisiana-Arkansas increased crude runs. As compared with a year ago crude runs for the week were 24,000 barrels higher daily average.

Production of gasoline increased 4,000,000 gallons while shipments dropped off 200,000 gallons. As a result stocks of gasoline backed up 5,100,000 gallons.

Current shipments still are above those of last year. Sales for the week were 7,200,000 gallons over those of the same week in 1929. Stocks a year ago were 20,000,000 gallons lower than at present.

Kerosene production increased 500,-

Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Feb. 21. Change in stocks figures from Jan. 24.

GASOLINE

	Gallons
Production	172,117,000
Shipments	163,238,000
Net change in stocks	+8,879,000
Ratio sales to production	94.8%

KEROSENE

Production	24,167,000
Shipments	26,798,000
Net change in stocks	—2,631,000
Ratio sales to production	110.9%

STOVE DISTILLATE

Production	7,696,000
Shipments	8,444,000
Net change in stocks	—748,000
Ratio sales to production	109.7%

GAS OIL

Production	28,857,000
Shipments	36,006,000
Net change in stocks	—7,149,000
Ratio sales to production	124.8%

FUEL OIL

Production	124,296,000
Shipments	126,461,000
Net change in stocks	—2,165,000
Ratio sales to production	101.7%

000 gallons in the past week and shipments increased 700,000 gallons. Stocks were cut 700,000 gallons. Each district except Oklahoma lowered inventories.

Distillate production and shipments were almost in balance. Gas oil stocks were cut 700,000 gallons while fuel oil stocks increased 2,000,000 gallons.

Carson Wins Spencer Bridge Contest

CHICAGO, Feb. 20.—John Carson, of the Lake Petroleum Co., Chicago, won the "Oil Industry Bridge Tournament" at the Spencer Petroleum Co.'s annual Valentine's Day housewarming. Mr. Carson was presented with a silver cup, and the unofficial title of "Bridge Champion of the S. O. Indiana territory." Frank Malone, Shell Petroleum Co., Chicago, took the "booby" prize, 2 packages of Mexican cigarettes. Approximately 150 guests were present, while 44 competed in the tournament.

Following are the other prize winners in the order they finished: Ed. Freeman, H. H. Cross Co., cocktail shaker; Chas. Rosenthal, Apex Motor Fuel Co., flask; G. C. Lilly, Johnson Oil Refining Co., pen and pencil set; Thos. Watson, Platt's Oilgram, set playing cards; Harry Dunn, H. P. Dunn Co., silk umbrella; John Messler, Crown Central Pet. Co., smokidor; Tommy Thompson, Chicago Oil Marketing Co., set playing cards; Chas. Chapin, Wilson Oil Corp., 2 decks cards; Dick Brennan, Petroleum Exchange Corp., 2 decks cards; John Stumpf, H. H. Cross Co., decanter; and Joe Mudd, Lake Petroleum Co., 2 Mexican cigars.

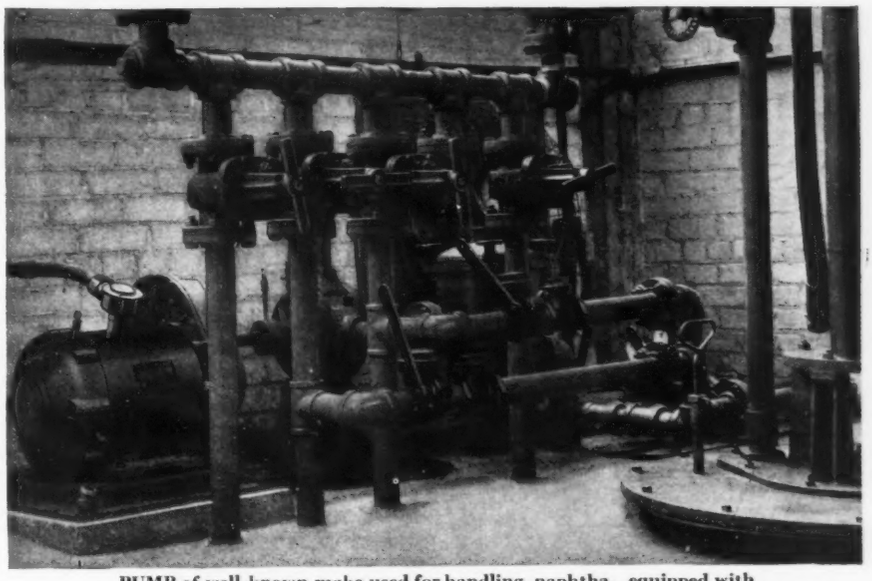
White Star to Expand Marketing Outlets

DETROIT, Feb. 21.—White Star Refining Co. of Detroit, contemplates consolidating its marketing position this year by building stations at points to which it may ship economically from its refineries at Wood River, Ill., and Trenton, Mich., according to H. B. Earhart, president, in a statement to stockholders.

The territory to be covered extends from the Niagara frontier on the east to St. Louis on the west, Mr. Earhart wrote.

The company is maintaining a balance between its refinery output and its markets, he wrote. The company also is leasing potential oil land in anticipation of the day when there may be less crude available than there is today. Some development work is contemplated immediately.

"SAFETY FIRST" In Pumping Naphtha!



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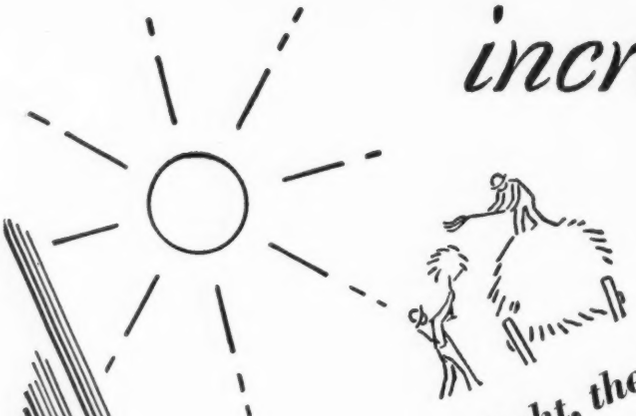

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Refinery - Tank Wagon Markets

National Petroleum News

Exporters Active in Mid-Continent; Trading Better in Other Markets

CLEVELAND, Feb. 25

REFINED oil markets were gradually regaining their equilibrium in most sections of the United States in the week ended Feb. 22. The week was not without numerous changes in tank car prices and an unusually large number of retail market price reductions, but at the same time buying in several refining districts increased materially and a more optimistic feeling was evident among traders generally.

Probably the outstanding activity of the week was the large volume buying done by representatives of the Export Petroleum Association in the Mid-Continent. The Association's buyers were reported to have placed orders for between 13 and 16 million gallons of gasoline for March shipment to the Gulf. North Texas refiners were said to have gotten most of the business.

The export buying coupled with a better demand from the domestic jobbing trade for both prompt and deferred shipment helped to keep gasoline prices in the Mid-Continent from slipping below the previous week's levels.

Distress gasoline on the west coast caused bulk prices for coastwise movement to recede approximately 0.25-cent a gallon. Several Atlantic seaboard buyers reported receiving offers of 8 cents c.i.f. for California gasoline. There was an unconfirmed report that one cargo had been sold at 7.50 cents, delivered on the east coast. On the basis of current high tanker rates, a delivered price range of 7.50 to 8 cents gives a netback of 5.25 to 5.75 cents f.o.b. California.

Tank car prices for gasoline along the Atlantic seaboard were down 0.25 to 0.50 cent. The feeling that prices had about reached bottom spread to some traders in this area. There were others, however, who felt that with the increasing volume of California gasoline moving to the east coast, tank car prices were due for further reductions.

Milder weather caused jobbers in the middle west to give more attention to their kerosene requirements. Increased buying of this commodity was noted particularly in the middle west. Prices failed to react favorably, however.

The milder weather affected domestic burning oils adversely. Prices for distillates and gas oils were down 0.125 to 0.25 cent generally with high gravity, low cold test fuel oils dropping 5 to 10 cents per barrel.

Lubricating oil prices generally were steady. Bright stock was offered more freely in the Pennsylvania market at the lower prices established in the week ended Feb. 15, but neutrals and cylinder stocks in other markets, as well as the Pennsylvania market, showed very little change.

Wax markets continued dull in all sections of the country but prices generally were holding their own.

Chicago Market Quiet; Prices Steady

Staff Special
CHICAGO, Feb. 22

THE Chicago Resale market was more settled the past week, following the tank wagon and crude oil price reductions of the previous week. Spot tank car gasoline and kerosene prices apparently were unaffected by these price reductions, but a number of sellers said that buying had been slowed up.

Various opinions were heard regarding the demand for light oils. Several sellers reported enjoying a fairly active demand for U. S. Motor gasoline, both for spot and future shipment, while others said their business was decidedly quiet. Most refiners reported their contract customers were ordering out goods in satisfactory quantities, but that spot demand was light. Evidently jobbers were not convinced that the spot market was at "bottom" or else thought it too early to start filling their storage.

Reports from a number of large retail distributors in the middle west indicated that the mild weather which prevailed had materially increased gasoline consumption. It was reported here that one of the largest jobbers in the middle west had been buying gasoline for storage purposes, paying from 5.50 to 5.75 cents for U. S. Motor and 60 gravity goods.

Generally speaking, prices of U. S. Motor gasoline, in the week ended Feb. 22, were unchanged over those prevailing at the close of business Feb. 15. The bulk of sales reported on gasoline originating in either Group 3 or differential territory were at 5.75 to 6.50 cents.

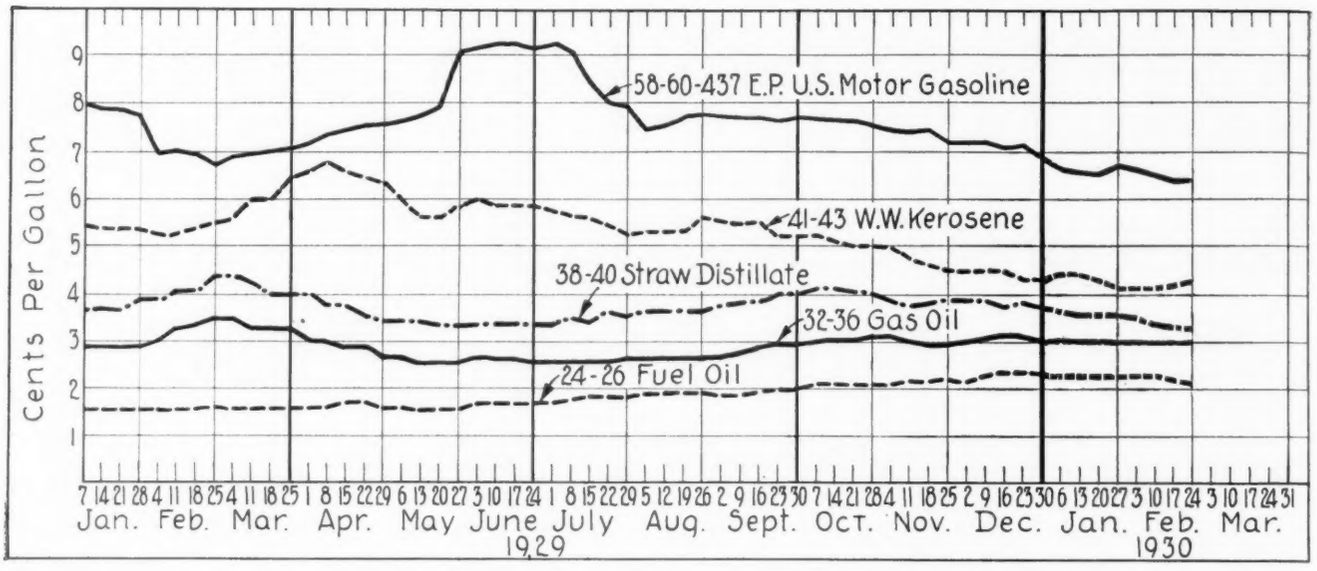
Carlot marketers reported their buying prices in North and West Texas mostly were 5.625 or 5.75 cents, although they could buy an occasional car at 5.50 cents. A few marketers reported they could get full specification Oklahoma U. S. Motor at 5.625 cents, but most of them said they were quoted 5.75 cents for material to be resold. They reported sales to jobbers at 5.75 to 6 cents for prompt shipment. One marketer said he sold some North Texas U. S. Motor, for March shipment, at 6 cents and some Oklahoma gasoline at 6.125 cents.

One or two Chicago district refiners, who had previously quoted U. S. Motor for resale at 5.75 cents, f.o.b. Group 3, advanced their prices to 5.875 cents. Most refiners both in the Group 3 and Chicago districts were asking 6 to 6.50 cents for U. S. Motor.

Demand for the higher gravity gasolines was fairly active, although most sellers reported it lighter than during the previous week. The 64-66, 375 e.p. grade moved at slightly lower prices, while other grades generally were unchanged.

Movement of kerosenes was fairly brisk in most quarters. While practically all sellers continued to quote the 41-43 w.w. grade at 4.125 to 4.25

Current Prices of Principal Mid-Continent Refined Products


58-60-437 E.P. U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Cents Per Gallon
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.
1929
1930

Prices shown are in Group 3 basis and extended to date shown in Refinery Market Tables Section of this issue

cents, there was less of this grade being offered at the lower figure. Two refiners, who move large quantities of kerosene into Michigan, Wisconsin, Indiana, Illinois and Ohio, reported they were practically sold up and were taking orders only from their regular customers.

Several sellers voiced the opinion that the narrow spread between tank wagon kerosene and gasoline prices since the Feb. 17 reduction would cut down the demand for kerosene. At a number of points in the Standard of Indiana territory tank wagon prices of both commodities were the same.

Distributors of fuel and furnace oils reported their business had been comparatively light the past week, due to the mild weather. Most of them said they were buying only what they absolutely had to on their contracts and were not entering the spot market at all.

Spot tank car prices of zero gas and fuel oils were lower and quite a bit of off specification goods were being offered at under the general market price range.

Rain or snow is likely in the Standard of Indiana territory at the first and last of next week, says the Chicago forecast bureau. Temperatures probably will be near the seasonal normal.

Chicago Club Elects

CHICAGO, Feb. 22.—Chas. R. Rosenthal, Apex Motor Fuel Co., was re-elected president of the Chicago Oil Mens' Club to serve for the coming year. I. A. Archambault, Pennsylvania Oil Co., was elected vice-president. R. J. Thompson, Apex Motor Fuel Co. and P. A. Watson, Sun Oil Co. were re-elected sec'y. and treasurer respectively.

The new board of directors consists of the foregoing four officers and B. L. Majewski, Shaffer Oil Refining Co.; R. T. Seidel, Agni Motor Fuel Co.; F. B. Sherwin, Triangle Oil Co.; F. E. Spencer, Spencer Petroleum Co. and R. M. McNeilly, Refiners Petroleum Co.

Shipments From Southern California

LOS ANGELES, Feb. 18.—Shipments of bulk petroleum from Southern California ports for week ended Feb. 15, were as follows: (in barrels)

Destination	Crude	Gasoline	Diesel	Distillate	Kerosene	Fuel	Gas-Oil	Lube
Pacific For.	63,432	67,713	96,693	57,744	88,066	285,486	.....	5051
Atlantic Dom.	.....	432,332	.....	.....	229,059	.....	.....	.....
Atlantic For.	.....	90,000	9,857	.....	.....	.....	69,492	.....

Total shipments from Los Angeles Harbor during January, 1930 showed a decrease of 1,427,927 barrels under shipments during December, 1929 and a decrease of 1,088,487 barrels under total shipments during January, 1929. The various petroleum products were distributed as follows:

Destination	Crude	Gasoline	Kerosene	Distillate	Diesel	Fuel	Lube
Pacific Dom.	678,448	845,911	18,184	3,503	176,656	1,963,756	.....
Pacific For.	439,032	175,082	194,468	.....	222,061	1,547,220	500
Atlantic Dom.	.....	1,687,575	122,064	91,824	77,621	.....	.....
Atlantic For.	.....	1,012,805	25,731	.....	173,254	.....	.....
Total							
Total shipments 1928						113,542,791 barrels	
Total shipments 1929						127,703,362 barrels	

Prices 10 Years Ago
Feb. 23, 1920

	Oklahoma	Penna.
58-60 U. S. Motor	19.75–20.00c	21.50–22.00c
80-84 Natural	22.75–23.00c	.....
Kerosene (41-43 Okla.; 47 w. w. Pa.)	11.25–11.50c	15.00c
Fuel Oil (24-26 Okla.; 38-40 Pa.)	$2.15–$2.35	11.25–12.00c
Crude (Okla. 35-35.9)	$3.00	$5.65
Chicago tank wagon		22.00c

Prices A Year Ago
Feb. 25, 1929

	Oklahoma	Penna.
58-60 U. S. Motor	6.7813c	9.00–9.50c
Grade A Natural	7.75c	.....
Kerosene (Okla. 41-43; Pa., 47 w. w.)	5.50c	7.625–8.00c
Fuel Oil (Okla. 24-26; Pa. 36-40)	$0.675	4.75–5.00c
Crude (Okla. 35-35.9)	$1.17	$4.00
Chicago tank wagon		14.00c

Mid-Continent Refinery Markets

Mild Weather Helps Gasoline Shipments

Staff Special
TULSA, Feb. 22

MILD weather in much of the middle west kept the Mid-Continent gasoline and kerosene markets steady throughout the week of Feb. 17 to 22, and caused an increased amount of optimism in the refining districts. Gasoline shipments continued to show a steady increase in volume, both on contracts and on spot purchases.

Buyers for the Export Petroleum Association late in the week gave some help to the optimistic feeling by announcing that they had closed for their March requirements, and would take between 13 and 16 million gallons of gasoline during that month. The association has been a steady buyer in the field since last fall, and these purchases have done a great deal to aid the refiners, particularly in the north Texas district.

Much of the low priced gasolines which had been on the market earlier in the month from Oklahoma, disappeared before the end of the week.

North Texas refiners have their export orders for February to complete, and now have their March orders on their books, and they accordingly will not be more than mildly interested in the domestic market.

Arkansas and Louisiana refiners reported exceptionally good weather in the southeast and their gasoline business was comparatively good.

Natural Gasolines

The buying which had been anticipated since the first of the month developed late in the week and natural gasolines responded by advancing in price from 0.125 to 0.50 cent.

Grade BB and grade C were scarce and goods available for spot shipment were closely held by manufacturers in anticipation of a better demand. Two or three manufacturers were reported oversold on these two grades early in the month and were counted on to come into the market to complete their orders.

Grade AA was somewhat freer but it was in sufficient demand to cause a small price advance. One large company had a contract for a sizable quantity expire Feb. 15 and the trade feared a portion of the goods which had been shipped on contract would be available for the spot market after that date. The sales manager of the company reported late in the week that his company was sold up for the month although nothing definite had been done with reference to a renewal of the contract.

Kerosenes

Demand for kerosenes continued to hold up well, a majority of refiners reported. Prices advanced slightly in Oklahoma and Kansas, while in north Texas recent export buying gave that market considerable strength.

Refinery representatives in the middle west reported that the mild weather was permitting the farmers to get into the fields for plowing and kerosene demand was expected to show considerable improvement provided the weather does not become severe again. A representative in Texas reported after a tour over that state this week that farmers were in the fields with their tractors almost everywhere he went.

Distillates and Gas Oils

The weather which helped the gasolines and kerosenes had the opposite effect on distillates. The demand was light and refiners reported their stocks were somewhat heavier than they had desired at this season of the year. Any buying from now on will be done cautiously.

Gas oils were comparatively steady although the low cold test oils were more freely offered in most districts. No price changes were noted during the week.

Fuel Oils

Refiners reported a lighter spot demand for fuel oils, particularly the higher gravity, low cold test grades. That was to be expected, however, with the approach of warmer weather. Demand for the lower gravity oils, however, was comparatively steady. A few price recessions were noted during the week, the Oklahoma refiners reporting that they had reduced quotations slightly in order to compete with north Texas fuels.

Neutral Oils, Cylinder Stocks

No changes were noted in prices for neutral oils or cylinder stocks. Demand for neutrals was comparatively good, most makers reported. Bright stock demand was light but refiners continued to quote unchanged prices. Considerable competition from other districts at lower prices were encountered. Much of the competition was from refiners who make a higher cold test oil than do the Oklahoma refiners.

Wax was quiet at unchanged prices.

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NATIONAL PETROLEUM NEWS
700 Penton Bldg.
Cleveland, Ohio

Comparative Prices of 58-60 U. S. Motor Gasoline, 437 E. P., Group 3 and Point of Origin, to Jobbers Only

In Effect February 24

	Price F.O.B. Group 3		*Price F.O.B. Point of Origin*		*If for Particular Destination*
Oklahoma	6.4468	(Wt. Avg.)	6.4468	(Wt. Avg.)	.....
Kansas	6.50	.....	.....	.....	S. O. Neb. & Indiana Territory, etc.
Kansas	.....	.....	6.5000	.....	Kansas only.
North Texas	5.75–6.00	.....	5.75–6.00	.....	.....
West Texas	5.75–6.00	.....	6.00	.....	.....
Louisiana-Arkansas	5.75–6.25	.....	.....	.....	Michigan, Ohio and Indiana.
Louisiana-Arkansas	.....	.....	6.50	.....	State or differential haul.
Indiana-Illinois	6.00–6.50	.....	.....*	.....	S. O. Indiana territory except Detroit and vicinity. For Ohio on delivered basis only.

*Shipments made from E. Chicago, Ind., and Wood River, Ill., according to conditions and freight rates; no prices F.O.B. point of origin can be given.

Chicago Resale Market

Chicago, Feb. 22

THE Chicago market was more settled last week. Tank car prices of gasoline and kerosene apparently were unaffected by the crude and tank wagon reductions of the previous week. Spot buying of U. S. Motor gasoline, however, apparently was slowed up somewhat by the cuts. The bulk of sales of U. S. Motor gasoline continued at 5.75 to 6.50 cents, regardless of the point of origin of the goods.

Following prices represent sales made on a Group 3 freight basis, although shipments may originate in other refining districts, such as North Texas, West Texas, Arkansas, Louisiana, Illinois, Indiana, Kentucky, etc.

	Prices Feb. 24	**Prices Feb. 17**	**Prices Feb. 10**
58-60 U. S. Motor, 437 e.p.	5.75 – 6.50	5.75 – 6.50	5.75 – 6.50
60-62 437 e.p. gasoline	5.875– 6.50	5.875– 6.50	5.875– 6.50
60-62 400 e.p. gasoline	6.25 – 6.50	6.25 – 6.75	6.25 – 6.75
64-66 375 e.p. gasoline	7.00 – 7.50	7.25 – 7.75	7.25 – 7.75
68-70 350-360 e.p. gasoline	7.50 – 8.00	7.75 – 8.00	7.75 – 8.00
41-43 w.w. kerosene	4.125– 4.25	4.125– 4.25	4 00 – 4.25
42-44 w.w. kerosene	4.375– 4.625	4.25 – 4.75	4.25 – 4.75
38-40 straw distillate	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
32-36 ordinary dark gas oil	2.50 – 2.75	2.50 – 2.75	2.625– 2.75
32-36 dark zero gas oil	2.875– 3.125	3.00 – 3.125	3.00 – 3.125
32-36 straw zero gas oil	3.125– 3.25	3.25	3.25
28-30 zero fuel oil (per bbl.)	$1.10 –$1.15	$1.125–$1.175	$1.125–$1.175
28-30 fuel oil (per bbl.)	$1.05 –$1.075	$1.075–$1.10	$1.075–$1.10
24-26 fuel oil (per bbl.)	$0.925–$1.00	$0.925–$1.00	$0.925–$1.00
18-22 fuel oil, low sulfur (per bbl.)	$0.775–$0.825	$0.80 –$0.825	$0.80 –$0.825
18-22 fuel oil, high sulfur zero (per bbl.)	$0.75 –$0.80	$0.775–$0 825	$0.775–$0.825

Weighted Average Prices

OKLAHOMA

	Feb. 24		**Feb. 17**		**Feb. 10**	
	No. of cars	**Price**	**No. of cars**	**Price**	**No. of cars**	**Price**
58-60 U. S. Motor, 437 e.p.	40	6.4468	37	6.5135	27	6.5092
60-62 437 e.p. gasoline	6	6.1667	1	6.5000	2	6.3750
60-62 400 e.p. gasoline	2	6.8750	5	6.7500	1	6.7500
64-66 375 e.p. gasoline	1	7.7500	1	7.7500	1	7.7500
*58-60 437 e.p. gasoline	..	5.875–6.50	..	5.75–6.50	..	5.75–6.50

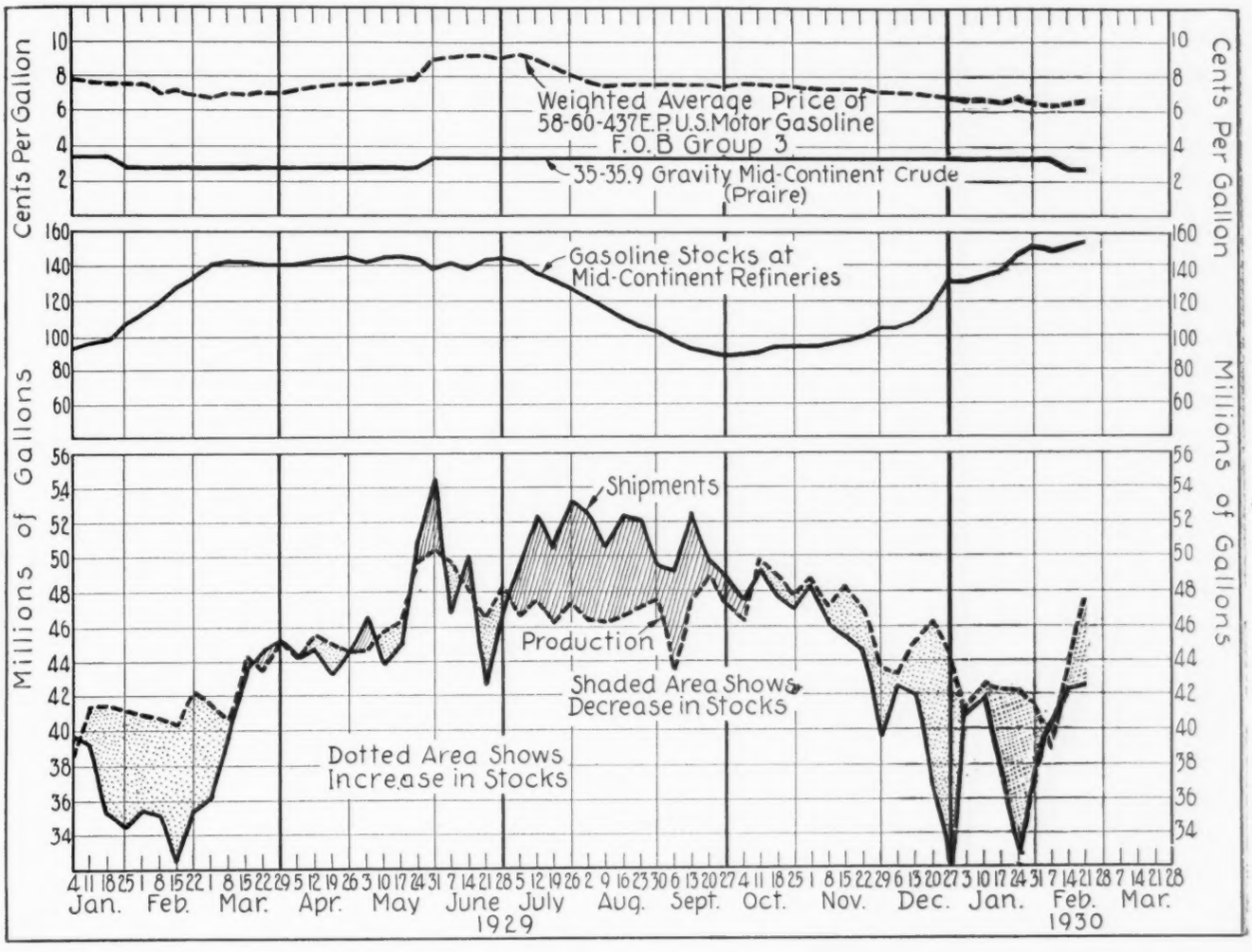
KANSAS

	Feb. 24		**Feb. 17**		**Feb. 10**	
	No. of cars	**Price**	**No. of cars**	**Price**	**No. of Cars**	**Price**
58-60 U. S. Motor, 437 e.p.	1	6.5000	No sales reported		No sales reported	

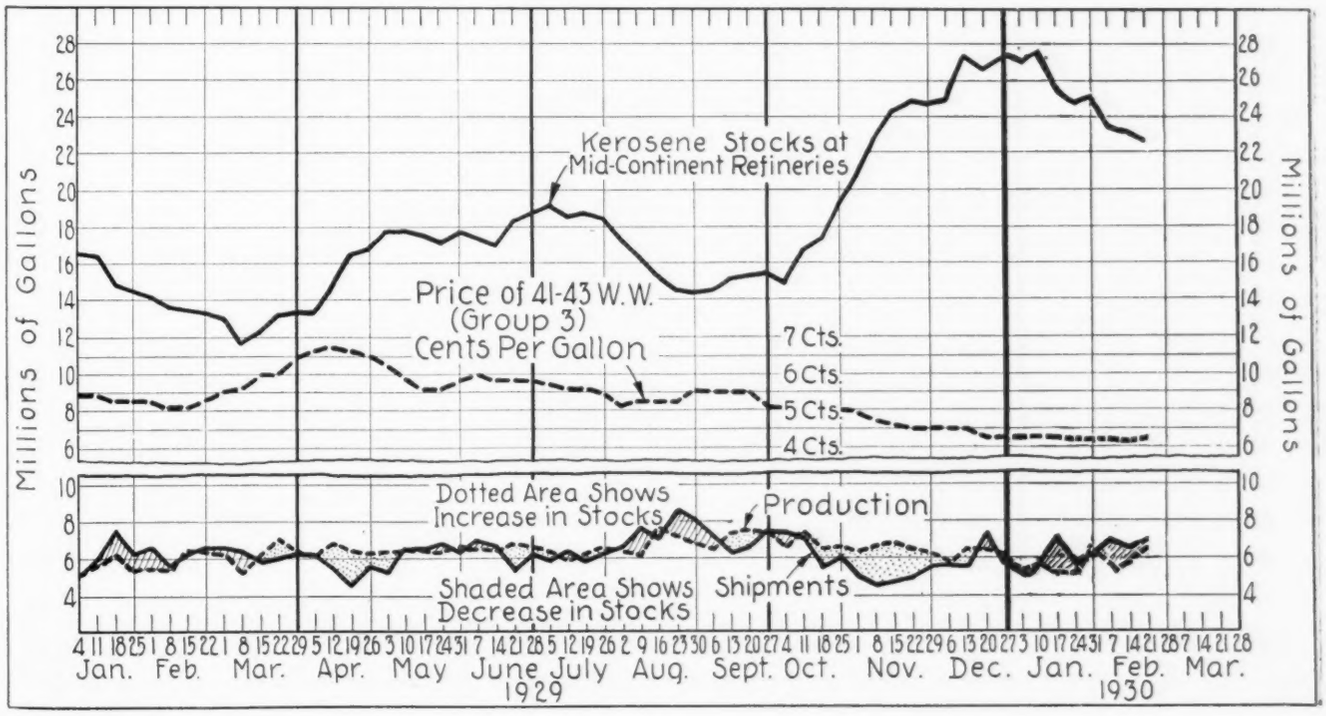
*Full U. S. Motor specifications not guaranteed. Prices represent both quotations and sales.

Barometer of Mid-Continent Refinery Market—Week Ending February 21

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Cents Per Gallon
Weighted Average Price of 58-60-437 E.P.U.S. Motor Gasoline F.O.B Group 3
35-35.9 Gravity Mid-Continent Crude (Praire)
Gasoline Stocks at Mid-Continent Refineries
Millions of Gallons
Shipments
Production
Shaded Area Shows Decrease in Stocks
Dotted Area Shows Increase in Stocks
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.
1929
1930

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date as shown in the table on page 98


Millions of Gallons
Kerosene Stocks at Mid-Continent Refineries
Price of 41-43 W.W. (Group 3) Cents Per Gallon
7 Cts.
6 Cts.
5 Cts.
4 Cts.
Dotted Area Shows Increase in Stocks
Production
Shaded Area Shows Decrease in Stocks
Shipments
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.
1929
1930

Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, F. O. B. refinery except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

OKLAHOMA	Prices Feb. 24	Prices Feb. 17	Prices Feb. 10
48-50 450 e.p. naphtha...	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
50-52 450 e.p. naphtha...	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
56-58 450 e.p. gasoline...	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
58-60 450 e.p. gasoline...	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
64-66 390 e.p. gasoline...	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
68-70 350-360 e.p. gasoline	7.875– 8.25	7.875– 8.25	7.875– 8.25
PENNSYLVANIA			
52-54 Naphtha.....	7.00 – 7.25	7.00 – 7.25	7.00 – 7.50
54-56 Naphtha.....	7.25 – 7.50	7.25 – 7.50	7.25 – 7.75
58-60 U.S. Motor 437 e.p.	7.50 – 7.75	7.50 – 7.75	7.50 – 7.75
60-62 400-410 e.p. gasoline	7.75 – 8.125	7.75 – 8.125	7.875– 8.25
64-66 390 e.p. gasoline....	8.00 – 8.50	8.125– 8.50	8.25 – 8.75
68-70 350-360 e.p.....	9.00 – 9.50	9.00 – 9.50	9.00 – 9.75
OHIO (Quotations of S. O. Ohio. 4c state tax to be added.)			
U. S. Motor Gasoline			
Ohio, delivery at any point.....	9.50	9.50	9.50
KANSAS (F. o. b. refinery Kansas destination)			
60-62 437 e.p. gasoline...	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25
60-62 400 e.p. gasoline...	6.75 – 7.50	6.75 – 7.50	6.75 – 7.50
64-66 375 e.p. gasoline...	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
NORTH TEXAS			
56-58 450 e.p. gasoline...	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
58-60 450 e.p. gasoline...	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
58-60 U.S. Motor 437 e.p.	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
60-62 400 e.p. gasoline...	6.125– 6.50	6.125– 6.50	6.125– 6.50
64-66 390 e.p. gasoline...	6.875– 7.25	6.875– 7.25	6.875– 7.25
64-66 375 e.p. gasoline...	7.50 – 7.75	7.50 – 7.75	7.50 – 7.75
68-70 350-360 e.p. gasoline	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
****WEST TEXAS (F.o.b. West Texas refinery, for unrestricted shipment)**			
50-52 naphtha.....	5.25	5.25	5.25
58-60 437 e.p. gasoline...	5.75	5.75	5.50 – 5.75
58-60 U.S. Motor 437 e.p. gasoline.....	6.00	6.00	5.75 – 6.00
NORTH LOUISIANA (N. La., Ark. and Miss. destination)			
58-60 U.S. Motor gasoline	6.50	6.50	6.50
ARKANSAS (Ark., N. La. and Miss. destination)			
58-60 U.S. Motor 437 e.p.	6.50	6.50	6.50
CALIFORNIA (3c tax to be added to California gasoline prices if used in state.)			
54-58 U.S. Motor 437 e.p.	8.00 – 9.25	8.50 – 9.50	8.50 – 9.00
54-58 U.S. Motor, for outside state shipment....	6.50 – 7.25	6.50 – 7.25	6.50 – 7.25
58-61 375-400 e.p. gasoline	9.00 –10.25	9.50 –10.50	9.50 –10.00
42-45 Engine Distillate 445-480 e.p.....	7.00 – 7.50	7.50 – 8.00	7.50 – 8.00

NATURAL GASOLINE

(Note: End point of all grades, not over 375 F. Corrosion test adopted Oct. 1, 1927; A.S.T.M. Method D130-27T; doctor test, July 2, 1928.)

OKLAHOMA			
Grade AA, 80-87.9, 90% Recovery.....	5.375– 5.50	*5.25 – 5.375	5.25 – 5.375
Grade A, 72-79.9, 90% Recovery.....	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625
Grade BB, 84-92, 85% Recovery.....	4.50	4.25	4.25
Grade B, 76-83.9, 85% Recovery.....	4.50	4.50	4.25
Grade C, 80-92, 78% Recovery.....	4.50	4.00 – 4.25	4.00 – 4.125
NORTH TEXAS (F. o. b. Breckenridge)			
Grade AA, 80-87.9, 90% Recovery.....	5.375– 5.50	*5.25 – 5.375	5.25 – 5.375
Grade A, 72-79.9, 90% Recovery.....	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625
Grade BB, 84-92, 85% Recovery.....	4.50	4.25	4.25
Grade B, 76-83.9, 85% Recovery.....	4.50	4.50	4.25
Grade C, 80-92, 78% Recovery.....	4.50	4.00 – 4.25	4.00 – 4.125
NORTH LOUISIANA (F. o. b. Monroe District)			
Grade AA.....	†5.50	†5.50	†5.50
Grade BB.....	†4.50	†4.50	†4.50
Grade C.....	†4.375	†4.375	†4.375
CALIFORNIA			
75-85, 375-390 e.p. blend	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50

BURNING OILS

PENNSYLVANIA			
45 w.w. kerosene.....	5.875– 6.00	5.875– 6.00	5.875– 6.00
46 w.w. kerosene.....	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
47 w.w. kerosene.....	6.25 – 6.50	6.25 – 6.50	6.125– 6.50
300 mineral seal.....	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
OKLAHOMA			
41-43 w.w. kerosene.....	4.125– 4.375	4.125– 4.25	4.00 – 4.25
42-44 w.w. kerosene.....	4.375– 4.50	4.375– 4.50	4.375– 4.50
KANSAS (F. o. b. refinery Kansas destination)			
41-43 w.w. kerosene.....	4.375– 4.75	4.125– 4.75	4.125– 4.75
42-44 w.w. kerosene.....	4.75 – 5.00	4.375– 4.875	4.375– 4.875
NORTH TEXAS			
40-42 w.w. kerosene.....	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00
41-43 w.w. kerosene.....	4.00 – 4.125	4.00 – 4.125	4.00
NORTH LOUISIANA (N. La., Ark. and Miss. destination)			
41-43 w.w. kerosene.....	5.00	5.00	4.75 – 5.00
42-44 w.w. kerosene.....	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25
ARKANSAS (Ark., N. La. and Miss. destination)			
42-44 w.w. kerosene.....	5.25	5.25	5.25
CALIFORNIA			
38-40 w.w. kerosene.....	4.00 – 5.00	4.00 – 5.00	4.00 – 5.00

NEUTRAL OIL

PENNSYLVANIA			
Vis.		**(Viscosity at 70° F.)**	
200 No. 3 Assoc. Filt.....	25.00 –26.00	25.00 –26.00	25.00 –26.00
180 No. 3 Assoc. Filt.....	21.00 –22.00	20.50 –22.00	20.50 –22.00
150 No. 3 Assoc. Filt.....	15.75 –17.00	16.00 –17.00	16.00 –17.00
		(Non Viscous)	
34 Grav. 330-340 Flash..	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
****OKLAHOMA**			
Vis. Color		**(Viscosity at 100° F.)**	
100—No. 2.....	6.00 – 7.50	6.00 – 7.50	6.00 – 7.50
150—No. 3.....	7.75 – 8.50	7.75 – 8.50	7.75 – 8.50
150—No. 4.....	6.75 – 8.00	6.75 – 8.00	6.75 – 8.00
180—No. 3.....	9.00 –10.00	9.00 –10.00	9.00 –10.00
180—No. 4.....	8.75 – 9.50	8.75 – 9.50	8.75 – 9.50
180—No. 5.....	8.50 – 9.00	8.50 – 9.00	8.50 – 9.00
200—No. 3.....	11.00 –12.50	11.00 –12.50	11.00 –12.50
200—No. 4.....	10.00 –11.00	10.00 –11.00	10.00 –11.00
200—No. 5.....	9.50 –11.00	9.50 –11.00	9.50 –11.00
220—No. 3.....	12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4.....	12.00 –12.50	12.00 –12.50	12.00 –12.50
220—No. 5.....	11.00 –12.00	11.00 –12.00	11.00 –12.00
240—No. 3.....	13.00 –15.00	13.00 –15.00	13.00 –15.00
240—No. 4.....	12.00 –13.50	12.00 –13.50	12.00 –13.50
240—No. 5.....	11.00 –13.00	11.00 –13.00	11.00 –13.00
280—No. 3.....	16.00 –17.00	16.00 –17.00	16.00 –17.00
280—No. 4.....	14.00 –16.00	14.00 –16.00	14.00 –16.00
280—No. 5.....	13.00 –15.00	13.00 –15.00	13.00 –15.00

†Prices nominal **††Only one refiner quoting** ***Quotations only** ****Represents Both Sales and Quotations.**

Refinery Markets Wax, Lubricants, Heavy Oil

Prices given below are in cents per gallon, F. O. B. refinery except where $ is shown

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

GULF COASTAL

Vis.	Color	Prices Feb. 24	Prices Feb. 17	Prices Feb. 10
		(Viscosity at 100° F., pour test 0)		
100	No. 2 Pale	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
200	No. 3 Pale	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
300	No. 3 Pale	10.75 –11.00	10.75 –11.00	10.75 –11.00
500	No. 3½ Pale	12.00 –12.25	12.00 –12.25	11.75 –12.00
750	No. 4 Pale	13.50 –13.75	13.50 –13.75	13.50 –13.75
1200	No. 5 Pale	16.00 –16.50	16.00 –16.50	16.00 –16.50
200	No. 5½ Red Oil	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
300	No. 5½ Red Oil	10.00 –10.25	10.00 –10.25	10.00 –10.25
500	No. 6 Red Oil	11.25 –11.50	11.25 –11.50	11.25 –11.50
750	No. 6 Red Oil	12.75 –13.00	12.75 –13.00	12.75 –13.00
1200	No. 5-6 Red Oil	15.00 –15.25	15.00 –15.25	15.00 –15.25

CALIFORNIA

Vis.	Color	(Viscosity at 100° F.)		
100	No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
200	No. 3	11.50	11.50	11.50
300	No. 3	13.00	13.00	13.00
450	No. 3	15.50	15.50	15.50
550	No. 3	16.50	16.50	16.50
600	No. 3	17.00	17.00	17.00
200	No. 5	11.00	11.00	11.00
300	No. 5	12.00	12.00	12.00
400	No. 5	14.00	14.00	14.00
500	No. 5	15.00	15.00	15.00
600	No. 5	16.00	16.00	16.00
700	No. 7	18.00	18.00	18.00

CYLINDER STOCKS

**OKLAHOMA

	Prices Feb. 24	Prices Feb. 17	Prices Feb. 10
190-200 Vis. D at 210° Brt. St.	41.00 –42.00	41.00 –42.00	41.00 –42.00
150-160 Vis. D at 210° Brt. St.	37.00	37.00	37.00
150-160 Vis. E 210° Brt. St.	35.00 –36.00	35.00 –36.00	35.00 –36.00
600 St. Ref. Olive Green	9.00 –10.00	9.00 –10.00	9.00 –10.00
600 St. Ref. Dark Green	9.00	9.00	9.00
Black Oil	5.00	5.00	5.00

PENNSYLVANIA (A. S. T. M. Tests)

600 Steam Refined, filterable	23.50 –25.00	23.50 –24.50	23.50 –25.00
650 Steam Refined	30.00 –31.00	29.50 –31.00	29.50 –31.00
600 Flash	31.00 –33.00	31.00 –33.00	31.00 –33.00
630 Flash	35.00 –36.00	35.00 –36.00	35.00 –36.00
600 Warren E	29.50 –31.00	30.50 –31.00	30.50 –31.00
600 Oil City E	28.50 –30.00	29.50 –30.00	29.50 –30.00
600 D Filtered	34.50 –35.00	34.50 –35.00	34.50 –35.00
Cold Test Stock, 40-50 p. p., 140-150 vis. at 210° 540-550 flash, No. 8 color	40.00 –41.50	40.00 –42.00	41.50 –42.00
40-50 p.p., 140-150 vis. at 210°, 540-550 flash, No. 6-6½ color diluted	39.00 –40.00	39.00 –40.00	40.00

WAX

PENNSYLVANIA (Per pound, New York)

122-124 white crude scale, a.m.p.	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
124-126 white crude scale, a.m.p.	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125

**OKLAHOMA

124-126 White Crude Scale, a.m.p.	2.75 – 3.125	2.75 – 3.125	2.75 – 3.125

CALIFORNIA

White crude scale, per pound, ton lots, a.m.p.	.....	6.00 – 6.50	6.00 – 6.50

DISTILLATE, GAS AND FUEL OIL

PENNSYLVANIA (For outside Pittsburgh district)

36-40 fuel oil	4.625– 5.00	4.75 – 5.00	4.75 – 5.00
30-34 fuel oil	4.625– 4.75	4.625– 4.875	4.625– 4.875
28-32 fuel oil	4.625– 4.75	4.625– 4.875	4.625– 4.875

OKLAHOMA

	Prices Feb. 24	Prices Feb. 17	Prices Feb. 10
38-40 straw distillate	3.25 – 3.50	3.25 – 3.50	3.25 – 3.625
36-38 straw distillate	3.00 – 3.25	3.00 – 3.25	3.125– 3.375
32-36 straw gas oil	3.00	3.00	3.00
32-36 straw gas oil zero	3.25	3.25	3.25
32-36 dark gas oil	2.625– 2.75	2.625– 2.875	2.625– 2.875
32-36 dark gas oil zero	2.875– 3.125	3.00 – 3.25	3.00 – 3.25
28-30 zero fuel oil (per bbl.)	$1.10 – 1.15	$1.125– 1.175	$1.125– 1.175
28-30 fuel oil (per bbl.)	$1.05 – 1.10	$1.05 – 1.15	$1.05 – 1.15
26-28 fuel oil (per bbl.)	$0.90 – 0.975	$0.90 – 1.00	$0.95 – 1.05
24-26 fuel oil (per bbl.)	$0.875– 0.925	$0.875– 0.925	$0.95 – 1.00
22-26 fuel oil (per bbl.)	$0.85 – 0.90	$0.85 – 0.90	$0.90 – 1.00
18-22 fuel oil (per bbl.)	$0.775– 0.875	$0.80 – 0.90	$0.80 – 0.90
16-20 fuel oil (per bbl.)	$0.70 –$0.75	$0.70 – 0.80	$0.70 – 0.85
14-16 fuel oil (per bbl.)	$0.70 –$0.75	$0.70 – 0.80	$0.70 – 0.85

KANSAS (F. o. b. refinery Kansas destination)

38-40 straw distillate	3.625– 4.00	3.625– 4.00	3.625– 4.00
36-38 straw distillate	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
32-36 straw gas oil	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
18-22 fuel oil (per bbl.)	$0.85 – 0.90	$0.85 – 0.90	$0.85 – 0.90
10-14 fuel oil (per bbl.)	$0.825– 0.875	$0.825– 0.875	$0.825– 0.875

NORTH TEXAS

38-40 straw distillate	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
38-40 p.w. treated distillate	3.50 – 3.625	3.50 – 3.625	3.50 – 3.625
32-36 gas oil, cracked	2.75	2.75	2.75
32-36 St. reduced gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
24-26 fuel oil (per bbl.)	$0.60 – 0.70	$0.70	$0.70
20-24 fuel oil (per bbl.)	$0.60	$0.60 – 0.70	$0.60 – 0.70
18-22 fuel oil (per bbl.)	$0.55 – 0.60	$0.60 – 0.65	$0.60 – 0.65

**WEST TEXAS (F.o.b. West Texas refinery, for unrestricted shipment)

34-38 gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
30-32 gas oil	2.25 – 2.50	2.25 – 2.50	2.25 – 2.50
28-30 zero gas oil	2.50 – 2.875	2.50 – 2.875	2.50 – 2.875
18-22 fuel oil (per bbl.)	$0.60 – 0.80	$0.60 – 0.80	$0.60 – 0.80

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

32-36 gas oil, dark	3.50	3.50	3.50
32-36 gas oil, straw	3.25	3.25	3.25
14-16 fuel oil (per bbl.)	$0.80 – 0.85	$0.80 – 0.85	$0.80 – 0.85

ARKANSAS (Ark., N. La. and Miss. destination)

32-36 gas oil, straw	3.50	3.50	3.50
32-36 dark gas oil	3.50	3.50	3.50
28-30 gas oil	3.25	3.25	3.25
20-24 fuel oil (per bbl.)	$0.95	$0.95	$0.95
9-12 fuel oil (per bbl.)	$0.75	$0.75	$0.75
Black oil	3.25	3.25	3.25

CALIFORNIA (F. o. b. San Joaquin Valley. At San Francisco 4c per bbl. more)

14-18 fuel oil (per bbl.)	$0.40 –$0.55	$0.40 –$0.50	$0.375–$0.50
14-18 Bunker oil (per bbl.)	$0.70 –$0.75	$0.70 –$0.75	$0.70 –$0.75
30-34 gas oil (per bbl.)	$0.70 –$0.90	$0.70 –$0.90	$0.70 –$0.90
27 Plus Diesel oil (per bbl.)	$0.70 –$0.90	$0.70 –$0.90	$0.70 –$0.90

PETROLATUMS

PENNSYLVANIA (Per pound, in barrels, carload lots, f. o. b. refinery. In tank cars ⅛c to ¾c per pound less.) Two refiners quoting.

Snow White	8.25 – 8.50	8.25 – 8.75	8.25 – 8.75
Lily White	7.25 – 7.50	7.25 – 7.75	7.25 – 7.75
Cream White	6.25 – 6.50	6.25 – 6.75	6.25 – 6.75
Light Amber	3.50 – 3.625	3.50 – 3.75	3.50 – 3.75
Amber	3.25 – 3.375	3.25 – 3.50	3.25 – 3.50
Red	3.00	3.00 – 3.25	3.00 – 3.25

PETROLEUM COKE

**OKLAHOMA

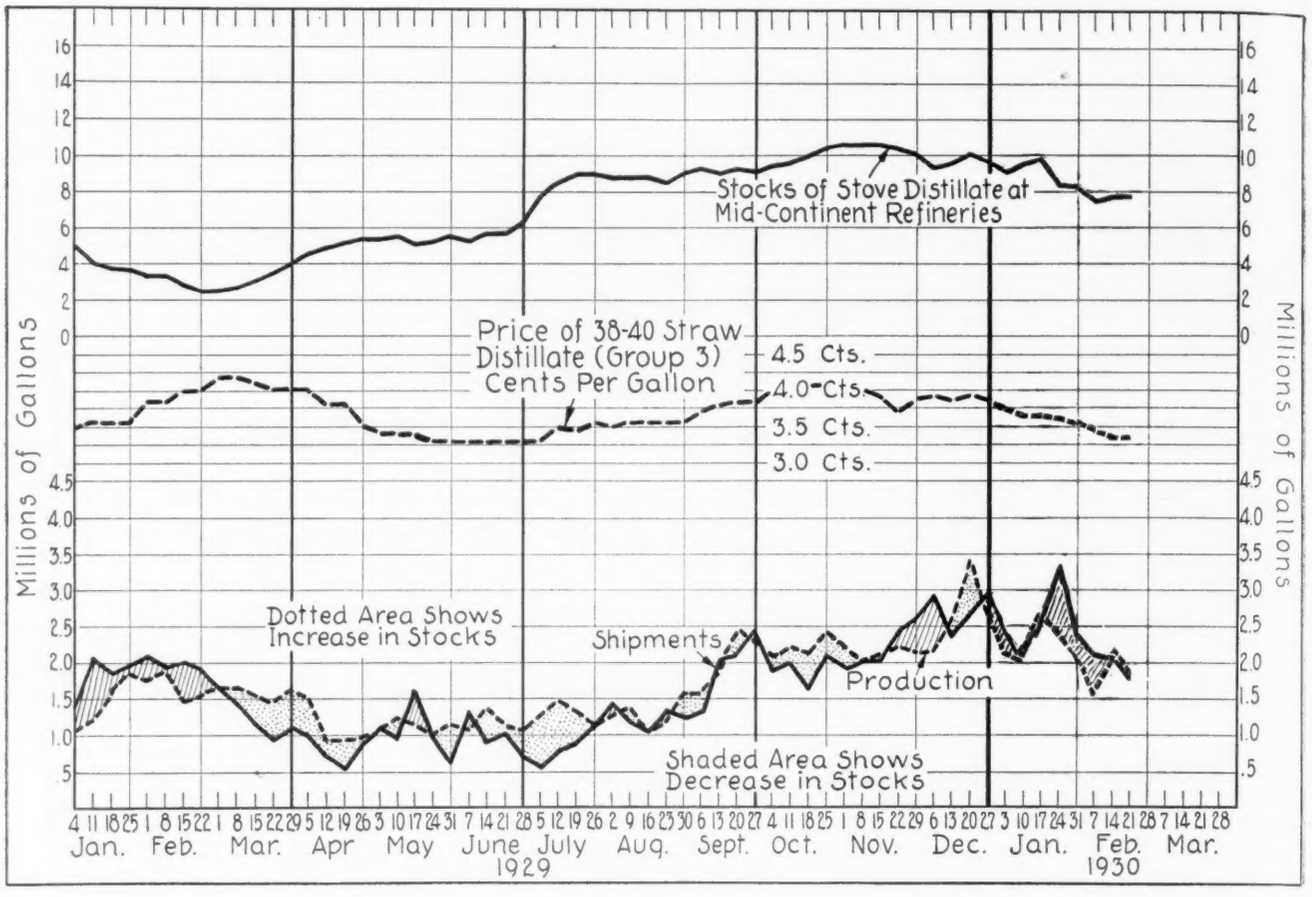
(Per ton in car lots)

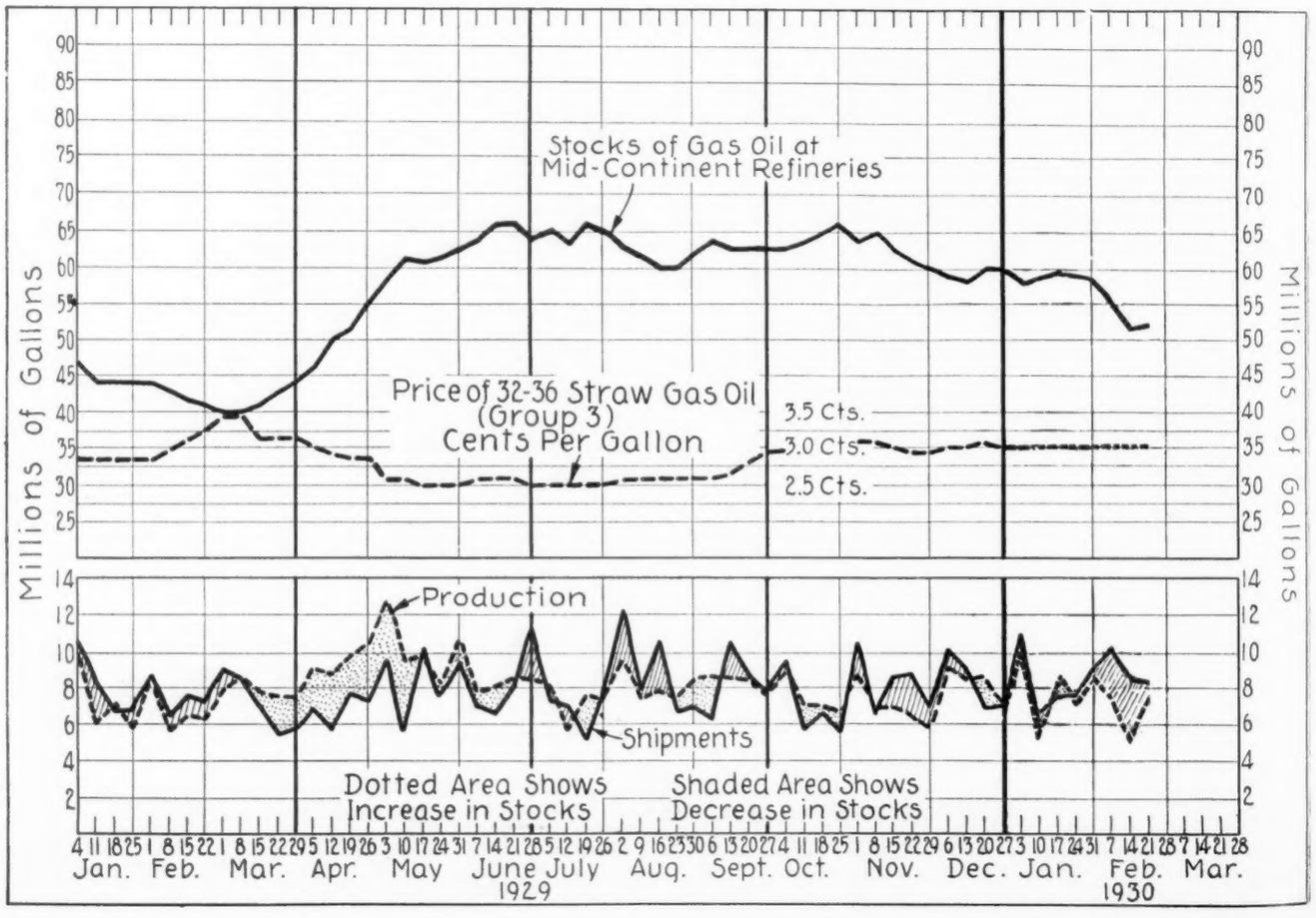
Lump	$4.50 – 5.00	$4.50 – 5.00	$4.50 – 5.00
Still run	$3.00	$3.00	$3.00
Breeze	$2.00	$2.00	$2.00

†Prices nominal ††Only one refiner quoting *Quotations only **Represents Both Sales and Quotations.

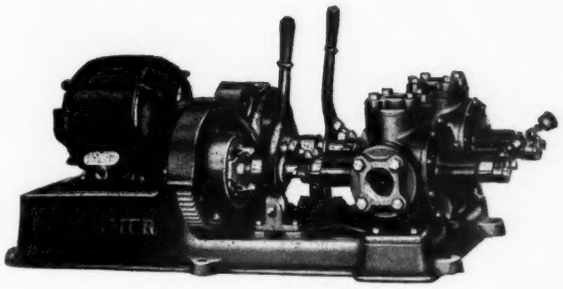
Barometer of Mid-Continent Refinery Market—Week Ending February 21

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Millions of Gallons
Stocks of Stove Distillate at Mid-Continent Refineries
Price of 38-40 Straw Distillate (Group 3) Cents Per Gallon
4.5 Cts.
4.0 Cts.
3.5 Cts.
3.0 Cts.
Dotted Area Shows Increase in Stocks
Shipments
Production
Shaded Area Shows Decrease in Stocks
Jan. Feb. Mar. Apr May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.
1929
1930


Millions of Gallons
Stocks of Gas Oil at Mid-Continent Refineries
Price of 32-36 Straw Gas Oil (Group 3) Cents Per Gallon
3.5 Cts.
3.0 Cts.
2.5 Cts.
Production
Shipments
Dotted Area Shows Increase in Stocks
Shaded Area Shows Decrease in Stocks
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.
1929
1930

"More Gallons Per Dollar"



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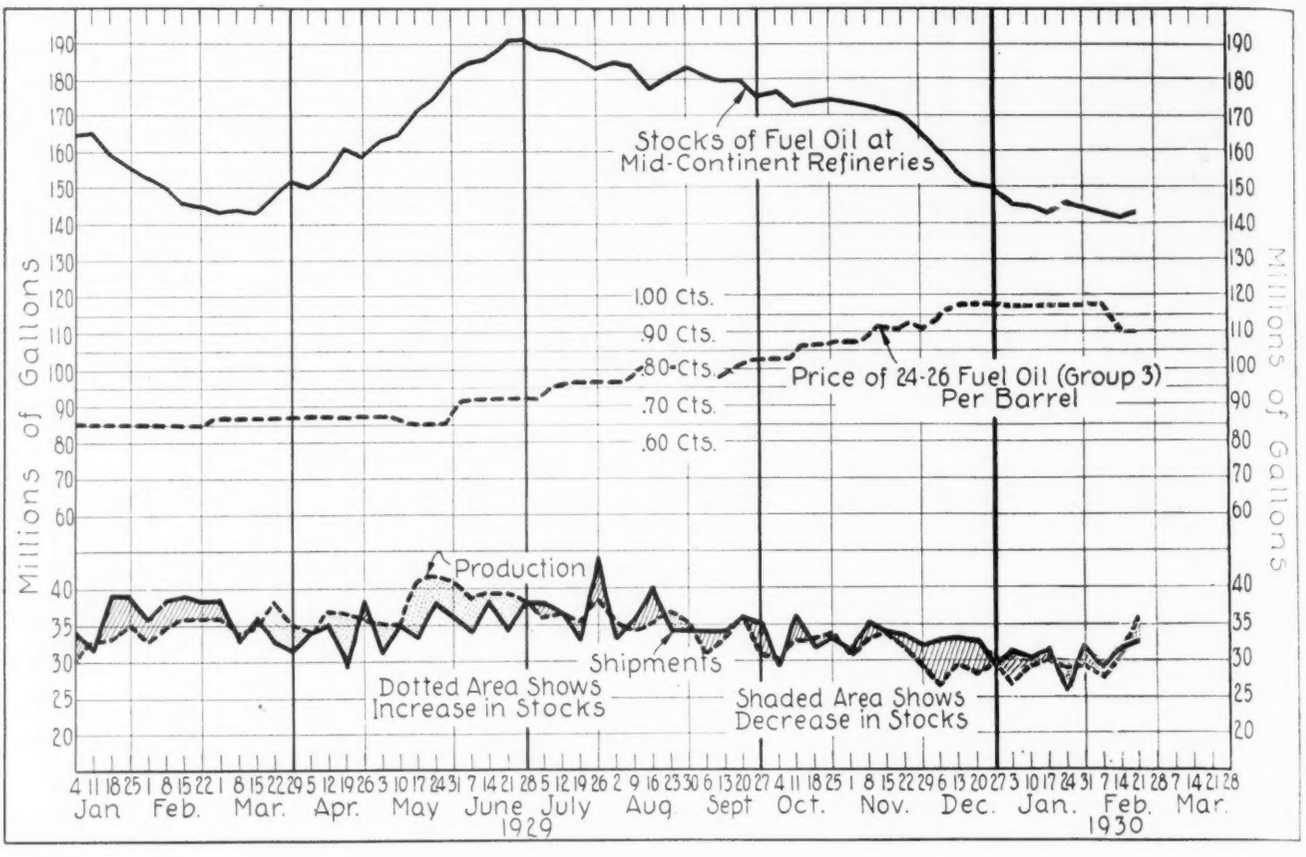
Barometer of Mid-Continent Refinery Market—Week Ending February 21

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News



California Refinery Market

Active Cargo Inquiry Revives Interest

LOS ANGELES, Feb. 20

CONSIDERABLE interest in the market was evidenced by exporters on the Pacific coast the past week as a result of numerous inquiries from buyers on the Atlantic seaboard and in Continental Europe. High tanker rates, however, continued to hamper actual business.

A French buyer was reported to have offered 60 shillings a ton for a clean boat and it was thought by many traders that negotiations for a cargo of gasoline had been concluded. Clean boats previously had been fixed at 55 and 56 shillings for Atlantic foreign ports. Tanker rates for north of Hatteras continued at around $1.05 per barrel.

On a firm offer an independent refiner was reported to have quoted 6 cents per gallon for a cargo of U. S. Motor gasoline to a Japanese buyer, but at latest reports the deal had not been closed.

A major California company recently sold two spot cargoes of 30 gravity crude oil to a Japanese company at $1.24 per barrel, f.o.b. the vessel. This cargo was made up of Santa Fe Springs and Signal Hill crudes which have market prices at the well of $1.20 and $1.25 per barrel, respectively.

A mixed cargo of 30,000 barrels of fuel oil and 32,000 barrels of 30 gravity gas oil was reported sold to an eastern buyer at $0.60 and $0.75 per barrel for the two grades, respectively.

Several open market sales of bunker oil for March delivery were reported, prices paid being around $0.64 per barrel. Several refiners reported that diesel oil and fuel oil export prices were a shade under those quoted the previous week. It was generally considered that diesel oil could be purchased as low as $0.70 per barrel and fuel oil sales were made during the past week at under $0.60, destination Pacific foreign ports.

Local tank car prices showed little change during the week ended Feb. 22, although spot sales were not in abundance.

Motor fuel continued to sell to out-of-state consumers at prices ranging from a shade under 6.50 cents up to 7 cents per gallon. In-state gasoline moved as low as 8 cents per gallon, without tax to jobbers who guaranteed not to resell to cut-rate service stations. Quotations for intrastate business ranged from 8 to 9.25 cents with the majority of sales being made at 8.50 to 9 cents.

Due largely to the shading of out-of-state gasoline prices California refiners reduced their quotations for engine distillate. Current quotations for this commodity ranged from 7 to 7.50 cents as compared with 7.50 to 8 cents previously.

Quotations for other domestic and export petroleum products remained unchanged from those quoted last week.

BALTIMORE—Gulf Refining Co. has applied for a permit to build a terminal in the Curtis Bay district with tankage for 350,000 gallons, warehouse, boiler house and machine shop. The plant will serve Maryland, District of Columbia and parts of Virginia and Maryland. The cost will be approximately $150,000.

Pennsylvania Market

Crude Cut Slackens Trading

CLEVELAND, Feb. 22.—Trading of virtually all commodities was extremely light in the western Pennsylvania market the past week as a result of the crude reduction Feb. 17. Unusually mild weather for the season of the year did little toward stimulating demand for gasoline and kerosene as might have been expected.

Running contrary to form, tank car prices of some oils improved following the cut in crude; few, if any, felt any adverse effect. Opinion among traders generally was that refined oil prices had long since discounted it.

Prices for cylinder stocks advanced as much as 1 cent a gallon in some instances during the early part of the week. This was due more to scarcity of material offered in the open market, however, rather than any substantial increase in demand, according to traders who are usually well informed.

Good filterable 600 steam refined cylinder stock was held at a minimum of 24 cents, but as the week advanced more material was offered for prompt shipment and the price slipped 0.50-cent as a result.

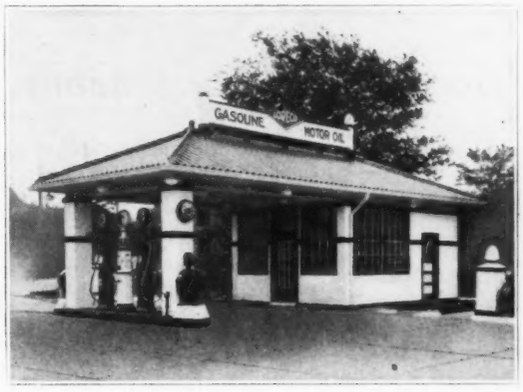
The supply of 650 steam refined was said to be very limited. A refiner, usually a seller of this grade, entered the market for a quantity to ship against his commitments and reported he was successful in securing only half of the amount he wanted at 30 cents a gallon. Odd cars had been available at 29.50 cents the previous week.

The demand for bright stock continued light but most manufacturers reported contracts were taking practically all of their current production and but very little surplus stock appeared in the open market.

The price of light bright fluctuated rather frequently. There were times during the past week when No. 8 color oil was unobtainable at less than 40.50 cents a gallon. Small lots were offered at 40 cents on Saturday, however, the same as at the end of last week. One manufacturer reported shading this price slightly to a favored buyer.

An eastern refiner was reported to have begun unloading a large shipment of bright stock which has been standing on track for several days, and indications were this refiner would re-enter the market for additional supplies as soon as the unloading had been completed. Spring demand from jobbers is expected to pick up considerably within the next 30 days.

Edwards "DIXIE" Model



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Eastern Domestic Markets

Lower Prices Stimulate Gasoline Buying

Staff Special
NEW YORK, Feb. 22

RECESSIONS in refiners' tank car prices of gasoline occurred in virtually all sections of eastern markets last week, continuing to reflect lower market trends in other sections of the United States which started two weeks ago.

U. S. Motor gasoline was lower in all districts with the exception of New York, price reductions occurring in more southern districts early in the week and spreading throughout New England toward the end. California gasoline also was lower.

Tank car gasoline quotations dropped 0.25 cent to 8.50 cents early in the week at Philadelphia, Baltimore, Norfolk, Charleston, Savannah and Jacksonville.

New England markets withstood price cuts in other districts until Feb. 22, when the majority of refiners there came down to meet competition. Boston and Providence quotations narrowed to a flat price of 10 cents for shipment both into those cities and adjacent territory.

Portland prices were down 0.25-cent on the top of the price range to 10.50 cents. Minimum quotations were 0.20-cent lower.

California U. S. Motor prices were forced down by lower quotations for regular U. S. Motor at New York and Philadelphia. Prices in the former district were cut to range from 8.50 to 8.75 cents, while Philadelphia sellers adopted a flat price of 8.50 cents.

The general opinion was that 8 cents c.i.f. points north of Cape Hatteras could be done easily, and some observers reported 7.875 cents could be done with firmer offers. An unconfirmed report was heard that a cargo was delivered to the east coast around the middle of the week at 7.50 cents, laid down.

At the present high rate for clean boats, a price of 8 cents c.i.f. the east coast, would give a netback of 5.75 cents to the California seller. This compares with the quoted market on the west coast of 6.25 to 7 cents per gallon f.o.b. California ports.

Tank wagon gasoline price cuts of 1 cent per gallon were made by Standard of New York at Albany, Rochester, Buffalo and Syracuse.

In summing up the week's activities several of the trade reported the price structure and undertone of the market showed a marked improvement and several advanced the opinion that prices were near bottom. This was particularly true of the New York harbor market, they said, which was favorably affected by the increase of 1 cent in the spread between tank wagon and service station prices and a reduction of tank car prices to the point where the jobber could operate at a fair profit.

The weather at all points has been excellent, temperatures rising to record breaking highs for February. Increased pleasure car driving brought storage down to favorable levels and jobbers were ordering more gasoline in the open market. Some of them, the trade reported, were interested in obtaining future requirements at current price levels, particularly in New York state and New England.

Kerosene prices were tending lower in all districts and spring demand was not looked to as a stabilizing factor. Shading of posted prices was reported at New York and Philadelphia and one refiner in the latter market was considering reducing his price to 7.50 cents.

Gulf Coast Markets

Trade Looks for Better Foreign Buying

Staff Special
NEW YORK, Feb. 22

A CARGO of gasoline and kerosene sold from the Gulf for export late the past week and the report that another buyer was in the market, were believed by some of the trade to be the forerunners of heavy spring buying by foreign accounts.

The cargo closed consisted of approximately 70,000 barrels for lifting late in March or early in April. It was sold to a French subsidiary of a leading American refiner. Three grades of gasoline, U. S. Motor, 60-62, 400 end point and 61-63, 390 end point, and one grade of kerosene, 41-43 prime white, made up the cargo. Association prices of 8.50, 9.50, 9.75 and 7 cents, respectively, governed in the transaction.

The trade was somewhat surprised that this account should inquire for quotations from sellers other than the parent company which is against its usual procedure. They believed the company was in dire need of material and sought to obtain it as quickly as possible.

The opinion that this company's stocks were low also was applied to those of other foreign concerns and several observers believed in the next few days Gulf markets will be active again. The general view held by the trade was that foreign buyers have put off filling their spring requirements until the last minute expecting to see a decline in association prices. That decline having failed to materialize they will be forced because of low storage to come into the market.

A report which lacked confirmation was heard that a French buyer was seeking a cargo of gasoline, endeavoring to buy under the prices posted by the association. Those well informed on the market reported this to be a fact but believed the transaction had fallen through. They said this account was working through an English concern with storage at London who was trying to buy in the Mid-Continent. The London company has been credited with several purchases which have moved from the Mid-Continent at low prices.

Relief to the Mid-Continent refiners as well as a stabilizing influence on domestic and foreign markets is seen in the move the association has made in buying large quantities of gasoline in the field. Four members of the association were reported to have sent representatives to the Mid-Continent to buy up surplus stocks and get them off the market. According to eastern trade reports they were expected to purchase around 20,000,000 gallons of gasoline. This gasoline will be stored at the Gulf, some observers believe, until such a time as it can be moved out without depressing the market.

Large quantities of gasoline are moving to the Continent from the west coast on contract, according to an eastern company which is active in that market.

A report to the effect that the Spanish Monopoly had purchased a quantity of Mid-Continent bright stock the past week could not be confirmed. The refiner sold the goods at less than the general market, according to the report, in order to relieve his storage.

Wax Markets

Demand Quiet; Prices Steady

NEW YORK, Feb. 22.—Little activity was reported in wax markets either at the Gulf or New York the past week. Prices generally were unchanged in both markets in comparison with a week ago, although some sellers' ideas of prices were at variance. Bids for white crude scale from United Kingdom buyers were lower than during the previous week.

White crude scale was reported freely available at 3 cents a pound by most of the trade; some sellers believed lower prices might be done with firm offer. This opinion applied both to the Gulf and New York markets.

A New York broker reported Saturday that 2.95 cents could be done in the Pennsylvania field but only on small quantities. A seller in the New York market said that 2.875 cents could be done for February, March and April delivery both at New York and the Gulf. One supplier was quoting 3.125 cents for white crude scale but reported receiving very few orders at this price, all of which were for small lots from domestic consumers.

United Kingdom buyers bid 3.15 cents per pound c.i.f. for white crude scale the past week in comparison with their offers of 3.35 cents the previous week. No business was transacted at that figure as far as could be learned.

No downward reaction in wax prices is expected because of the crude reductions in Pennsylvania and the Mid-Continent or the generally depressed condition of petroleum markets. Wax being mostly a by-product of the petroleum industry is affected largely by supply and demand, and not so much by the price of the raw material. Some of the trade estimate that less than 2 per cent of a refiner's throughput is run to wax and that the crude market has little or no effect on this small percentage.

Fully refined waxes continued to move principally against contracts the past week. This movement has been sufficiently heavy to keep stocks at favorable levels, the trade reported. The majority of refiners were quoting current prices for forward shipment.

Correction

Price of U. S. Motor gasoline at New York harbor in the Eastern Domestic Market on page 114 of the Feb. 19 issue of National Petroleum News was published at 8.50 to 8.75 cents as of Feb. 17. Correct price on Feb. 17 was 8.25 to 8.50 cents. Price is corrected in this issue.

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Complete Seaboard Market

(Export Markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the whole year)

Eastern Domestic Market

(Prices for tank car lots, f. o. b. refinery or seaboard terminal, representing majority of quotations.)

U. S. MOTOR GASOLINE	Feb. 24	Feb. 17	Feb. 10
New York harbor	8.25 – 8.50	8.25– 8.50	8.50 – 8.75
Portland district	**10.30–10.50	**10.30–10.75	**10.30–10.75
Boston district	*10.00	**10.00–10.25	**10.00–10.25
Providence district	*10.00	**10.00–10.25	**10.00–10.25
Philadelphia district	8.50	8.50– 8.75	8.75
Baltimore district	8.50	8.50– 8.75	8.50 – 8.75
Norfolk district	8.50	8.50– 8.75	8.75
Charleston district	8.50	8.50– 8.75	8.75
Savannah district	8.50	8.50– 8.75	8.75
Jacksonville district	8.50	8.50– 8.75	8.50 – 8.75
CALIFORNIA, U. S. MOTOR GASOLINE			
New York harbor	8.50 – 8.75	8.75	8.75
Philadelphia district	8.50	8.50 – 8.75	8.75
Baltimore district	8.50 – 8.75	8.50 – 8.75	8.50 – 8.75
WATER WHITE KEROSENE			
New York harbor	7.625– 7.75	7.625– 7.75	7.75
Philadelphia district	7.75	7.75	7.75
Baltimore district	7.75	7.75	7.75
GAS OIL: 28-34 Gravity			
New York harbor	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
Boston district	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
FURNACE OIL: 36-40 Gravity			
New York harbor	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
Boston district	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
GRADE C BUNKER OIL†			
New York Harbor	$1.05	$1.05	$1.05
Boston district	$1.05	$1.05	$1.05
DIESEL OIL			
New York harbor	$2.00 –$2.10	$2.00 –$2.10	$2.00 –$2.10

Note: Above gasoline prices do not include inspection tax levied in some states.
*Minimum delivered. †Lighterage 5c per bbl. additional. **Delivered prices.

New York Export Market

(Lubricating oils are per gal. in bbls. F.a.s. New York)

	Feb. 24	Feb. 17	Feb. 10
CYLINDER OILS (Pennsylvania Products)			
Bright stock, dark	46.50 –50.00	46.50 –50.00	47.00 –50.00
600 D filtered	39.75 –42.00	39.75 –42.00	39.75 –42.00
600 Warren E filtered	35.00 –37.00	34.50 –36.00	34.50 –36.00
600 s.r. unfiltered	30.00 –31.00	30.00 –31.00	30.00 –31.00
650 s.r. unfiltered	36.00 –37.00	36.00 –37.00	36.00 –37.00
600 flash, s.r.	38.50 –40.00	38.50 –40.00	38.50 –40.00
630 flash, s.r.	42.50 –44.00	42.50 –44.00	42.50 –44.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00 –21.00	20.00 –21.00	20.00 –21.00
250 vis. No. 6 color	17.50 –18.50	17.50 –18.50	17.50 –18.50
200 vis. No. 6 color	16.50 –17.50	16.50 –17.50	16.50 –17.50
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	23.00 –24.00	23.00 –24.00	23.00 –24.00
180 vis. No. 3¼ color	19.00	19.00	19.00
100 vis. No. 2¼ color	15.50 –16.00	15.50 –16.00	15.50 –16.00
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	30.00	30.00	30.00
500 vis. No. 6½ color	26.50 –27.50	26.50 –27.50	26.50 –27.50
400 vis. No. 7¼ color	23.00 –25.00	23.00 –25.00	23.00 –25.00
300 vis. No. 6 color	20.00 –22.00	20.00 –22.00	20.00 –22.00
200 vis. No. 6 color	18.00 –20.00	18.00 –20.00	18.00 –20.00

Wax Markets

(Prices in cents per pound, A.S.T.M. tests; A.M.P.)

NEW YORK (F.a.s. carload lots).	Feb. 24	Feb. 17	Feb. 10
124-126 Yellow crude scale	2.875– 3.00	2.875– 3.00	2.875– 3.00
122-124 White crude scale	3.00	3.00	3.00
124-126 White crude scale	3.00	3.00	3.00
123-125 Fully refined	4.00 – 4.125	4.00 – 4.125	4.00 – 4.125
125-127 Fully refined	4.00 – 4.25	4.00 – 4.25	4.125– 4.25
128-130 Fully refined	4.25 – 4.50	4.25 – 4.50	4.375– 4.50
130-132 Fully refined	4.50 – 4.75	4.50 – 4.75	4.50 – 4.75
133-135 Fully refined	5.625– 5.75	5.625– 5.75	5.625– 5.75
135-137 Fully refined	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
NEW ORLEANS (F.a.s. carload lots)			
124-126 Yellow crude scale	2.875	2.875	2.875
122-124 White crude scale	3.00	3.00	3.00
124-126 White crude scale	3.00	3.00	3.00
123-125 Fully refined	3.875– 4.00	3.875– 4.00	3.875– 4.00
125-127 Fully refined	4.00	4.00	4.00
128-130 Fully refined	4.125	4.125	4.125
130-132 Fully refined	4.375	4.375	4.375
133-135 Fully refined	5.50	5.50	5.50

Gulf Export Market

(Prices are f. o. b. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. or more unless otherwise noted and for export shipment only).

GASOLINE	Feb. 24	Feb. 17	Feb. 10
U. S. Motor	8.50	8.50	8.50
60-62, 400 e.p.	9.50	9.50	9.50
61-63, 390 e.p.	9.75	9.75	9.75
64-66, 375 e.p.	10.00	10.00	10.00
U. S. Motor, cases (cargoes)	$1.85	$1.85	$1.85
64-66, cases (cargoes)	$2.05	$2.05	$2.05

KEROSENE	Prices Feb. 24	Prices Feb. 17	Prices Feb. 10
44 water white	8.00	8.00	8.00
41-43 prime white	7.00	7.00	7.00
Water white, cases (cargoes)	$1.85	$1.85	$1.85
Prime white, cases (cargoes)	$1.75	$1.75	$1.75
DOMESTIC GAS & BUNKER OILS			
*26-30 translucent gas oil	3.875– 4.00	3.875– 4.00	3.875– 4.00
*30 plus translucent gas oil	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25
Grade C bunker oil	$0.95	$0.95	$0.95
Grade C bunker oil, cargoes	$0.68 –$0.70	$0.68 –$0.70	$0.68 –$0.70

*Less than ½ of 1% sulphur.

MEXICAN CRUDE AND BUNKER OILS (F. O. B. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$0.70 –$0.75	$0.70 –$0.75	$0.70 –$0.75
Grade C bunker oil for bunkering purposes, taxes paid	$1.00	$1.00	$1.00

SOUTH TEXAS LUBRICATING OILS (Viscosity at 100°F. cold test 0. Tanker, f. o. b. Houston)			
100 vis. No. 2 unfiltered pale	6.00	6.	6.00
200 vis. No. 3 unfiltered pale	8.50	8.50	8.50
300 vis. No. 3 unfiltered pale	9.50	9.50	9.50
500 vis. No. 3½ unfiltered pale	11.25	11.25	11.25
750 vis. No. 4 unfiltered pale	12.50 –12.75	12.50 –12.75	12.50 –12.75
1200 vis. No. 5 unfiltered pale	16.00	16.00	16.00
200 vis. No. 5-6 red oil	7.25	7.25	7.25
300 vis. No. 5-6 red oil	8.50	8.50	8.50
500 vis. No. 5-6 red oil	9.50	9.50	9.50
750 vis. No. 5-6 red oil	11.50	11.50	11.50
1200 vis. No. 5-6 red oil	15.00	15.00	15.00

Gulf Domestic Market

(Prices are f.o.b. Gulf oil terminals in Texas and Louisiana in shipments of 20,000 bbls. or more, representing sellers' opinions, for domestic shipment only).

	Feb. 24	Feb. 17	Feb. 10
U. S. Motor gasoline	7.00 – 7.125	7.00 – 7.125	7.00 – 7.125
41-43 w.w. kerosene	5.875– 6.25	5.875– 6.25	5.875– 6.25
*26-32 translucent gas oil	3.875– 4.125	3.875– 4.125	3.875– 4.125

*Less than ½ of 1% sulphur.

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Feb. 24	Feb. 17	Feb. 10
Gasoline, U. S. Motor, 53-55 Gravity	6.00 – 7.00	6.25 – 7.00	6.25 – 7.00
Gasoline, U. S. Motor-blends and special cuts	7.25 –10.00	7.25 –10.00	7.25 –10.00
Gas Oil, 30-34, per barrel	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Diesel Oil, 27 plus, per barrel	$0.75 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Bunker oil, 14-18, per barrel	$0.65 –$0.85	$0.65 –$0.85	$0.65 –$0.85
Fuel oil, 14-18 per barrel	$0.60 –$0.85	$0.60 –$0.85	$0.60 –$0.85
Kerosene, 38-40 w.w., 125-150 flash, per gal.	5.00 – 6.00	5.00 – 6.00	5.00 – 6.00
Cased Goods			
Gasoline, U. S. Motor	$1.75 –$1.85	$1.75 –$1.85	$1.75 –$1.85
Kerosene, 38-40 w.w., 125, 150 flash	$1.45 –$1.50	$1.45 –$1.50	$1.45 –$1.50

Note: Above Pacific Export market prices for gasoline and kerosene in cargo lots apply only on goods for coastwise shipment. Gasoline and kerosene prices for shipment to foreign ports are determined as follows: Difference in freight between U. S. Gulf to European Continent and California to European Continent —this difference plus 0.125c for handling, deducted from prices posted at U. S Gulf by the Export Petroleum Assoc., Inc., which are above prices.

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 pounds, British sterling; to American ports, cents per barrel.)

	Feb. 24 Crude &/or Fuel	Feb. 24 Refined Oil &/or Spirits
Calif. to U. K. or Continental ports*	35-40	60-65
Gulf to U. K. or Continental ports*	24-26	50
North Atlantic to U. K. or Continental ports*	20/6–23/6	47/6
Calif. to North Atlantic ports (not E. of N. Y.)	$1.15	$1.00–$1.11
Gulf to North Atlantic ports (not E. of N. Y.)**	45	40

*Continental ports in the range between Bordeaux and Hamburg, both inclusive

**Venezuela loading same rate. For Tampico 3c to 4c per bbl. additional

NOW WE CAN FILL THE *big ones quickly*

"SKY high. That's the way our gallonage has jumped since we put in meter pumps. Now we can really offer the big ones—the ten ton trucks and the twenty-gallon tankers—like this Mercedes—some fast service. It's the big ones that give us a profit."

G & B Meter Pumps help profits in other ways. The operating cost is practically nothing. One pumping unit served more than 250,000 gallons quietly—and with hardly a trace of wear. There are many unique selling features—all explained in Bulletin T-105. Write or wire for your free copy—today.

GILBERT AND BARKER MANUFACTURING COMPANY

PUMPS AND TANKS FOR THE OIL TRADE

SPRINGFIELD, MASS.

"DEPENDABLE PUMPS FOR EVERY SERVICE STATION NEED"

Tank Wagon, Service Station Markets for Gasoline and Kerosene

(OIL PRICE HANDBOOK has t. w. and s. s. markets for a whole year, arranged for quick reference)

These Prices in Effect Feb. 24, 1930, as Posted by Principal Marketing Companies

S.O. NEW JERSEY TERRITORY

	Gasoline		Total		Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Newark, N. J.	13.5	2	15.5	17.5	12.5
Annapolis	14	4	18	20	13
Baltimore, Md.	13.2	4	17.2	19.2	10.5
Cumberland, Md.	15	4	19	21	14
Washington, D. C.	13.7	2	15.7	17.7	12.7
Danville, Va.	14.8	5	19.8	21.8	13.8
Norfolk, Va.	13.3	5	18.3	20.3	11
Richmond, Va.	13.7	5	18.7	20.7	12.7
Roanoke, Va.	15	5	20	22	14
Petersburg, Va.	14.3	5	19.3	21.3	13.3
Charleston, W. Va.	14.5	4	18.5	20.5	12.5
Keyser, W. Va.	15.1	4	19.1	21.1	14.1
Parkersburg, W. Va.	13.2	4	17.2	19.2	11.2
Wheeling, W. Va.	14.4	4	18.4	20.4	12.4
Charlotte, N. C.	15.3	5	20.3	22.3	14.3
Hickory, N. C.	15.8	5	20.8	22.8	14.8
Mt. Airy, N. C.	15.5	5	20.5	22.5	14.5
Salisbury, N. C.	15.7	5	20.7	22.7	14.7
Charleston, S. C.	13.3	6	19.3	21.3	12.3
Columbia, S. C.	15.2	6	21.2	23.3	14.2

Note: 2c per gallon discount off t.w. price of gasoline to dealers and commercial consumers thru S. O. New Jersey territory.

CONTINENTAL OIL

Denver, Colo.	14	4	18	21	15.5
Pueblo, Colo.	14	4	18	21	15.5
Grand Junc., Colo.	18	4	22	25	19
Casper, Wyo.	14	4	18	21	14
Cheyenne, Wyo.	15.5	4	19.5	22.5	15.5
Butte, Mont.	18.5	5	23.5	26.5	20
Helena, Mont.	18.5	5	23.5	26.5	20
Salt Lake City, Utah	16.5	3½	20	23	17
Boise, Ida.	18.5	4	22.5	25.5	19
Twin Falls, Ida.	18.5	4	22.5	25.5	19
Albuquerque, N. M.	15	5	20	22	17

S. O. CALIFORNIA

				*Plant	
Phoenix, Ariz.	14	4	18	22	20
Los Angeles, Cal.	16.5	3	19.5	22.5	15.5
Fresno, Cal.	17	3	20	23	17
San Francisco, Cal.	17	3	20	23	15.5
Reno, Nev.	21	4	25	28	19
Portland, Ore.	17.5	4	21.5	24.5	16.5
Seattle, Wash.	17.5	3	20.5	23.5	16.5
Spokane, Wash.	21.5	3	24.5	27.5	20.5
Tacoma, Wash.	17.5	3	20.5	23.5	16.5

Note: 4c per gal. discount to dealers off t.w. price of gasoline to customers taking tank truck delivery, thru S. O. California territory except 1c discount at Phoenix to dealers only.

*This represents retail sale price of gasoline for delivery into fuel tanks of customers' automotive equipment at S. O. California refineries, terminals and district depots as this company operates no retail service stations.

S. O. LOUISIANA

Little Rock, Ark.	13	5	18	20	13
Alexandria, La.	‡13	4	‡17	19	†14
Baton Rouge, La.	12	4	16	16	†14
Lake Charles, La.	††14	4	††18	††20	†14
New Orleans, La.	*11	4	*15	15	†12
Shreveport, La.	12	4	16	18	†14
Lafayette, La.	**14	4	**18	**20	†14
Bristol, Tenn.	14	5	19	20	14
Chattanooga, Tenn.	15	5	20	22	13
Knoxville, Tenn.	15	5	20	22	16
Nashville, Tenn.	14	5	19	21	16
Memphis, Tenn.	13	5	18	20	12.5

Note: 2c per gallon discount off t.w. price of gasoline to dealers thru S. O. Louisiana territory.

*New Orleans gasoline prices include 1c parish tax in addition to 4c state tax, and kerosene prices include 1c state tax and 1c parish tax.

†Kerosene price in Louisiana includes 1c state tax.

**Lafayette gasoline prices include 1c parish tax in addition to 4c state tax.

††Lake Charles gasoline prices include 1c parish tax.

‡Alexandria gasoline prices include 1c parish tax

S. O. KENTUCKY

Ashland, Ky.	15	5	20	21	15
Catlettsburg, Ky.	15	5	20	21	15
Lexington, Ky.	13	5	18	20	14.5
Louisville, Ky.	14	5	19	21	13
Covington, Ky.	14	5	19	20	14.5
Clarksdale, Miss.	13	5	18	20	12.5
Gulfport, Miss.††	15.5	5	20.5	22.5	13
Jackson, Miss.	14	5	19	21	13
Natchez, Miss.	13.5	5	18.5	20.5	13
Vicksburg, Miss.	13.5	5	18.5	20.5	13
Birmingham, Ala.	15	4	19	21	14.5
Mobile, Ala‡.	15	4	19	21	13.5
Montgomery, Ala.*	16	4	20	22	15

Latest Changes in Tank Wagon Prices

Gasoline

S. O. New York—T.w. and s.s. cut 1c, Syracuse, to 15.8c and 17.8c, respectively, **Feb. 17.**

T.w. and s.s. cut 1c, Buffalo, to 14.8c and 16.8c, and Rochester, to 15c and 17c respectively, both including 2c tax, **Feb. 19.**

T.w. and s.s. cut 1c, Albany, to 15.6c and 17.6c respectively, **Feb. 22.**

T.w. and s.s. cut 1c, Burlington, to 18.3c and 20.3c respectively, **Feb. 22.**

S. O. Kentucky—T.w. and s.s. up 2c, Birmingham, to 19c and 21c respectively, **Feb. 17.**

T.w. and s.s. up 1c, Mobile, to 19c and 21c, and Montgomery, to 20c and 22c respectively, both including 4c tax, **Feb. 17.**

S.s. price only of gasoline up 2c, Jacksonville, to 22c, **Feb. 21.**

S. O. Ohio—T.w. and s.s. cut 2c, Athens County, both to 15c, **Feb. 20.**

T.w. up 3c and s.s. 4c, Liverpool and Yellow Creek townships, to state wide structure of 18c t.w. and 19c s.s., **Feb. 18.**

T.w. up 1c and s.s. 2c, Columbiana County and Saline Township, to state wide structure of 18c t.w. and 19c s.s., **Feb. 19.**

S. O. Louisiana—S.s. only cut 1c, New Orleans, to 15c, same as tank wagon, **Feb. 20.**

S.s. only cut 1c, Baton Rouge, to 16c same as tank wagon, **Feb. 20.** There was also a cut of 1c, **Jan. 15,** making the s.s. price as of that date 17c.

Magnolia Petroleum—T.w. and s.s. cut 1c, Dallas, to 16c and 20c, and Fort Worth, to 16c and 19c respectively, both including 4c tax, **Feb. 18.**

Kerosene

S. O. Ohio—Kerosene cut 2c, Darke County, to 10c t.w., **Feb. 13.**

S. O. New York—Kerosene cut 1c Buffalo, to 11.8c t.w. and Rochester, to 12c t.w., **Feb. 21.**

S. O. Kentucky—Kerosene up 1½c, Birmingham, to 14½c t.w., **Feb. 17.**

	Gasoline		Total		Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Atlanta, Ga.	14	6	20	22	†15.5
Augusta, Ga.	15	6	21	23	†15.5
Macon, Ga.	15	6	21	23	†15.5
Savannah, Ga.	14	6	20	22	†14
Jacksonville, Fla.	14	6	20	22	14
Miami, Fla.	15	6	21	23	14
Tampa, Fla.	14	6	20	22	13
Pensacola, Fla.**	12	6	18	20	13.5

Note: Net price of gasoline to dealers is 2c under posted t.w. price thru S. O. Kentucky territory.

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included. ‡Mobile gasoline prices include 1c city tax

†Georgia kerosene prices include 1c state tax.

**Both tank wagon prices include 1c city tax at Pensacola which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

S. O. NEBRASKA

Omaha, Neb.	14.25	4	18.25	20.25 13.25
McCook	15.75	4	19.75	21.75 14.75
Norfolk	14.75	4	18.75	20.75 13.75
North Platte	15.75	4	19.75	21.75 14.50
Scottsbluff	15.75	4	19.75	21.75 14.25

S. O. INDIANA

Chicago, Ill.	14	3	17	18	13
Decatur, Ill.	14.2	3	17.2	18.2	13.1
E. St. Louis, Ill.	13.4	3	16.4	17.4	12.2
Joliet, Ill.	14.4	3	17.4	18.4	13.3
Peoria, Ill.	14.2	3	17.2	18.2	13.1
Quincy, Ill.	14.2	3	17.2	18.2	12.9
Indianapolis, Ind.	14.2	4	18.2	19.2	14.2
Evansville, Ind.	14	4	18	19	14
South Bend, Ind.	14.4	4	18.4	19.4	14.4
Detroit, Mich.	14.8	3	17.8	18.8	14.7
Grand Rapids, Mich.	14.7	3	17.7	18.7	14.6
Saginaw, Mich.	14.9	3	17.9	18.9	14.8
Green Bay, Wisc.	14.6	2	16.6	17.6	13.4
Madison, Wisc.	14.3	2	16.3	17.3	13.1
Milwaukee, Wisc.	14.1	2	16.1	17.1	12.9
La Cross, Wisc.	15.2	2	17.2	18.2	14
Minneapolis, Minn.	15.2	3	18.2	19.2	13.9
Duluth, Minn.	15.5	3	18.5	19.5	13.9
Mankato, Minn.	15.1	3	18.1	19.1	13.7

	Gasoline		Total		Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Des Moines, Ia.	14.5	3	17.5	18.5	13.3
Davenport, Ia.	14.5	3	17.5	18.5	13.3
Sioux City, Ia.	14.1	3	17.1	18.1	12.9
Mason City, Ia.	14.5	3	17.5	18.5	13.3
St. Louis, Mo.	*13.9	2	15.9	16.9	12.3
Kansas City, Mo.	†14.9	2	16.9	17.9	11.6
St. Joseph, Mo.	†14.5	2	16.5	17.5	12.2
Fargo, N. D.	16.9	3	19.9	20.9	15.9
Grand Forks, N. D.	17.2	3	20.2	21.2	16.2
Minot, N. D.	16.9	3	19.9	20.9	15.9
Pierre, S. D.	15	4	19	20	14.4
Huron, S. D.	15.3	4	19.3	20.3	14.7
Wichita, Kans.	12.8	3	15.8	14.8	11.8
Bartlesville, Okla.	12.5	4	16.5	17.5	11.5

S. O. Indiana's quantity contract price schedule thru territory except in Chicago and Detroit on tank truck deliveries of gasoline, figured from the service station price is 2c for 500 gals. or more a month; 2½c for 2000 gals. or more a month and 3c for 6000 gals. or more a month.

In Chicago and vicinity, these discounts apply. Over 500 gals. per month, 2c per gal. off service station price; over 1,000 gals. per month, 4c per gal. off service station price.

In Detroit, effective Feb. 8, 1930, dealers and consumers signing contract for all gasoline for year, get 4c per gal. off s.s. price. Non-contracted accounts get 3c off s.s. price.

*Includes city tax of ½c.

†Includes city tax of 1c.

S. O. OHIO

Ohio state-wide	14	4	18	19	12
Darke and Hancock Counties	13	4	17	17	12
Athens County	11	4	15	15	12

Note: Discount to dealers and commercial accounts generally thru Ohio is 2c per gal. off t.w. price with some exceptions. In counties where prices are below normal, discount is 3c per gal. off t.w. price.

MAGNOLIA PETROLEUM

Muskogee, Okla.	10	4	14	16	10
Oklahoma City	11	4	15	18	10
Tulsa, Okla.	11	4	15	19	10
Fort Smith, Ark.†	11	†4	15	17	12
Little Rock, Ark.	13	5	18	20	13

Above prices include these inspection fees on both gasoline and kerosene, per gallon: Alabama, 1/40c on gasoline, 1/2c kerosene; Arkansas, 1/20c on both; Florida, 1/8c on both; Georgia, 1/10c on both; Illinois, 3/100c on both; Indiana, 4/25c to 1/2c on both; Kansas, 3/50c on both; Louisiana, 1/32c on gasoline; Minnesota, 3/50c on both; Missouri, 3/10c to 1/2c on both; Nebraska, 3/50c to 1/2c on both; North Carolina, 1/4c on both; North Dakota, 1/20c on both; Oklahoma, 4/25c on both; South Carolina, 1/8c on both; South Dakota, 1/10c on both; Tennessee, 2/5c on gasoline and 1/2c to 4/5c on kerosene; Wisconsin, 3/50c on both.

Kerosene inspection fees only, per gallon; Iowa, 7/100c; Michigan 1/5c to 4/5c per gal.

Tank Wagon, Service Station Markets for Gasoline and Kerosene

Prices in Effect Feb. 24, 1930

MAGNOLIA PETROLEUM

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
Texarkana, Ark.*	13	*4	17	19	12
Dallas, Tex.	12	4	16	20	12
Fort Worth, Tex.	12	4	16	19	12
Houston, Tex.	11	4	15	19	11
San Antonio, Tex.	11	4	15	19	11
El Paso, Tex.	12	4	16	20	14

*Within city of Texarkana, the state tax on gasoline is 4c per gal. conforming with the Texas state tax. In this district outside of the city the 5c Arkansas tax applies.

†Within city of Fort Smith, Oklahoma tax of 4c applies. In this district outside of the city, the 5c Arkansas tax applies.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

Greater New York City: Boroughs of Manhattan, Bronx, Queens & Kings	13.3	2	15.3	17.3	12.3
Borough of Richmond	13.7	2	15.7	17.7	12.7
Albany, N. Y.	13.6	2	15.6	17.6	13.6
Buffalo, N. Y.	12.8	2	14.8	16.8	11.8
Rochester, N. Y.	13	2	15	17	12
Syracuse, N. Y.	13.8	2	15.8	17.8	13.8
Boston, Mass.	13.5	2	15.5	17.5	12.5
Augusta, Me.	14.8	4	18.8	20.8	13.8
Manchester, N. H.	14.4	4	18.4	20.4	13.4
Burlington, Vt.	14.3	4	18.3	20.3	14.3

Note: S. O. New York allows 3c off t.w. price to dealers in New York City, and 2c off t.w. price thru rest of territory.

ATLANTIC REFINING

Pittsburgh, Pa.	15	*	15	21	13
Philadelphia, Pa.	15	*	15	21	13
Allentown, Pa.	15	*	15	21	13
Erie, Pa.	15	*	15	19	13
Scranton, Pa.	15	*	15	21	13
Altoona, Pa.	15	*	15	21	13
Dover, Del.	15	3	18	20	13
Wilmington, Del.	15	3	18	20	13
Boston, Mass.	13.5	2	15.5	17.5	12.5
Springfield, Mass.	14.5	2	16.5	18.5	13.5
Worcester, Mass.	14.3	2	16.3	18.3	13.3
Fall River, Mass.	14.1	2	16.1	18.1	13.1
Providence, R. I.	13.7	2	15.7	17.7	12.7
Hartford, Conn.	14.5	2	16.5	18.5	13.5
New Haven, Conn.	14.6	2	16.6	18.6	13.6
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Camden, N. J.	13.6	2	15.6	17.6	12.6
Trenton, N. J.	14	2	16	18	13
Annapolis, Md.	14	4	18	20	13
Baltimore, Md.	13.2	4	17.2	19.2	10.5
Hagerstown, Md.	14.7	4	18.7	20.7	13.7
Richmond, Va.	13.7	5	18.7	20.7	12.7
Wilmington, N. C.	13.4	5	18.4	20.4	12.4
Brunswick, Ga.	14	6	20	22	**15
Jacksonville, Fla.	14	6	20	20	14

Note: 2c per gal. discount off t.w. price of gasoline on sales to dealers; discount to commercial accounts under contract for one year in accordance with Code of Ethics.

*4-cent state tax is collected by retail dealer and paid by him directly to state.

**Georgia kerosene prices include 1c state tax.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M.&P. Naphtha	Cleaner Naphtha
Chicago	14.7	16.7	17
Detroit	17.4	18.9	20.7
Kansas City	†15.9	†17.4	†19.2
Milwaukee	16.4	*19.9	*21.7
Minneapolis	**20.7	**22.2	**24
St. Louis	15.6	17.1	18.9
New York		16	23
Boston		19	23

*Includes 2c state tax. †Includes 1c city tax.
**Includes 3c state tax.

Petroleum Spirits (Solvent)

Tank Cars (F.o.b. refinery or seaboard terminal)	
New York harbor	11.00
Philadelphia district	11.00
Providence	11.50
Tank Wagon or Steel Barrels	
New York City	18
Syracuse	18
Rochester	18
Buffalo	18
Providence	19
Boston	19
Bridgeport	18
Newark	18
Philadelphia	16
Baltimore	18

Note: 2c off above t.w. prices to large buyers in some instances.

(Continued on Page 124)

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Guarantees the Quality of
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COASTAL AND PARAFFINE CRUDES
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NAPHTHA — GAS — OILS
WAX — PETROLEUM COKE
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The Rewards of using *the Right* TIRES

Throughout the oil industry, widely different driving conditions call for widely different types of tires—but all can be of the same make: GOODYEAR.

The Petroleum Heat and Power Company of Boston, Mass., chose 36 x 7 Goodyear Super Cushions on this truck, used for fuel oil delivery, and these tires had delivered 36,398 miles at the time this picture was taken. "By the looks of them," writes Geo. Hurst, Superintendent of Transportation, "they should go another 20,000 miles."

Where higher average speed is desired, oil and gasoline delivery trucks receive exceptional service from the Goodyear All-Weather Tread Pneumatic, made with extra-durable, extra-elastic SUPERTWIST Cord.

Call on Goodyear for expert technical recommendations on the *right* truck tire for your hauling. Goodyear Truck Tire Service Stations everywhere give prompt, competent, accurate and helpful service.

On your new trucks, specify Goodyears

GOODYEAR

Copyright 1929, by The Goodyear Tire & Rubber Co., Inc.

More Tons Are Hauled on Goodyears Than on Any Other Tires

Crude Oil Prices (in Effect Feb. 24, 1930)

(Crude prices for the whole year in OIL PRICE HANDBOOK published annually)

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

(All Penna. Grade Crude Effective Feb. 17, 1930)

†Bradford—Alleghany district.....$3.00
Bradford District Oil in New York Transit Lines (Bradford District).....††$2.75
Bradford District Oil in National Transit Lines (Bradford District).....††2.75
Penna. Grade Oil in National Transit Lines (Other Pennsylvania).....*2.80
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)..... 2.75
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)..... 2.65
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)..... 2.45
Wayne district crude in Cumberland lines (West Virginia)..... 1.24
Corning Grade in Buckeye Pipe Lines (Ohio) (Effective Feb. 17, 1930)..... 1.65
Corning, O., heavy grade (Effective Feb. 17, 1930) 1.55
Somerset Oil in Cumberland Pipe Lines (Kentucky) (Effective Feb. 17, 1930).... 1.37
Somerset Oil in Eureka Pipe Lines (Effective Feb. 17, 1930)..... 1.21
Ragland Grade in Cumberland Pipe Lines (Kentucky) (Effective Jan. 29, 1929)....$0.60

*Oil run prior to July 1, 1929 is $2.75 per bbl.
†Posted by Tide Water Pipe Co., Ltd.
††Oil run prior to July 1, 1929 is $2.70 per bbl.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines (Effective Feb. 19, 1930).....$1.45

MICHIGAN

(Posted by Dixie Oil Co.)

Traverse and Dundee (Muskegon):

32-32.9	$1.08	39-39.9	$1.29
33-33.9	1.11	40-40.9	1.32
34-34.9	1.14	41-41.9	1.35
35-35.9	1.17	42-42.9	1.38
36-36.9	1.20	43-43.9	1.41
37-37.9	1.23	44 and above	1.44
38-38.9	1.26		

(Posted by Pure Oil Co.)

Midland, Midland County.....$1.25

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective Feb. 15, 1930

Wooster	$1.75	Princeton	$1.60
Lima	1.65	Illinois	1.60
Waterloo	1.20	Plymouth	1.18
Indiana	1.42	West Kentucky	1.50

CANADIAN CRUDE

Posted by Imperial Oil Refineries, Ltd.

Petrolia.....$2.05
Oil Springs..... 2.12

OKLAHOMA, KANSAS and NORTH TEXAS

Prices of Prairie Oil & Gas Co.

(In Oklahoma, Kansas, North and East Central Texas)

Effective Feb. 15, 1930

Below 25	$0.60	35-35.9	$1.17
25-25.9	0.66	36-36.9	1.20
26-26.9	0.72	37-37.9	1.23
27-27.9	0.78	38-38.9	1.26
28-28.9	0.84	39-39.9	1.29
29-29.9	0.90	40-40.9	1.32
30-30.9	0.96	41-41.9	1.35
31-31.9	1.02	42-42.9	1.38
32-32.9	1.08	43-43.9	1.41
33-33.9	1.11	44 and above	1.44
34-34.9	1.14		

Above prices were posted by Humble and The Texas Co. on Jan. 15; on Jan. 16 by Magnolia in Texas, and Jan. 17 in Oklahoma and Kansas; and on Feb. 13 by Sinclair; by Carter Oil on Jan. 16.

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Boggy Creek, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

Humble's prices in above fields same as Prairie's, but effective Jan. 15, 1930.

Magnolia Petroleum Co.

(In Oklahoma, Kansas and North and East Central Texas)

Magnolia posts in above fields and in Panola Co., same schedule as Prairie, which see. Its postings in Texas were effective Jan. 16, and in Oklahoma and Kansas, Jan. 17, 1930.

Jan. 16, 1930, Glasscock, Crane, Upton, Winkler, Howard and Mitchell Counties same prices as Humble's postings in Winkler, Crane, etc., which see.

Iatan district.....$0.93
Corsicana heavy..... 0.75
Luling..... 0.75
Mirando..... 0.75
Darst Creek, 60° F. gravity..... 1.05

Carter Oil Co.

(Oklahoma and Kansas)

Jan. 16, 1930, same schedule as Prairie, which see.

PANHANDLE, TEXAS

Humble Oil & Refining Co.

Effective Jan. 15, 1930

Hutchinson and Carson Counties:

Below 32	$0.72	38-38.9	$0.96
32-32.9	0.78	39-39.9	0.99
33-33.9	0.81	40-40.9	1.02
34-34.9	0.84	41-41.9	1.05
35-35.9	0.87	42-42.9	1.08
36-36.9	0.90	43-43.9	1.11
37-37.9	0.93	44 and above	1.14

Wheeler County:

Below 30	$0.70	37-37.9	$1.03
30-30.9	0.76	38-38.9	1.06
31-31.9	0.82	39-39.9	1.09
32-32.9	0.88	40-40.9	1.12
33-33.9	0.91	41-41.9	1.15
34-34.9	0.94	42-42.9	1.18
35-35.9	0.97	43-43.9	1.21
36-36.9	1.00	44 and above	1.24

Gray County:

Below 29	$0.69	37-37.9	$1.08
29-29.9	0.75	38-38.9	1.11
30-30.9	0.81	39-39.9	1.14
31-31.9	0.87	40-40.9	1.17
32-32.9	0.93	41-41.9	1.20
33-33.9	0.96	42-42.9	1.23
34-34.9	0.99	43-43.9	1.26
35-35.9	1.02	44 and above	1.29
36-36.9	1.05		

Above prices met by The Texas Co. on Jan. 15, and Magnolia on Jan. 16.

WEST TEXAS

Humble Oil & Refining Co.

Effective Jan. 15, 1930

Winkler, Crane, Upton, Crockett, and Pecos Counties, also Lea County, N. Mex.

Below 25	$0.55	31-31.9	$0.76
25-25.9	0.58	32-32.9	0.79
26-26.9	0.61	33-33.9	0.82
27-27.9	0.64	34-34.9	0.85
28-28.9	0.67	35-35.9	0.88
29-29.9	0.70	36 and above	0.91
30-30.9	0.73		

Howard and Glasscock counties:

Effective Jan. 15, 1930

Below 25	$0.55	31-31.9	$0.72
25-25.9	0.58	32-32.9	0.74
26-26.9	0.61	33-33.9	0.76
27-27.9	0.64	34-34.9	0.78
28-28.9	0.66	35-35.9	0.80
29-29.9	0.68	36 and above	0.82
30-30.9	0.70		

Jan. 15, 1930, The Texas Co. posted same prices in Crane, Upton, Winkler and Lea, and Magnolia, on Jan. 16, in Crane, Upton, Winkler, Glasscock, Howard and Mitchell as Humble in Winkler, Crane etc.

SOUTHWEST TEXAS

(Posted by Humble Oil & Refining Co.)

Effective Jan. 15, 1930

Mirando.....$0.75
Salt Flat..... 1.05
Darst Creek..... 1.05

NORTH LOUISIANA—ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana

Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton, De Soto, Sabine and **Cotton Valley.

Effective Jan. 16, 1930

Below 28	$0.78	36-36.9	$1.20
28-28.9	0.84	37-37.9	1.23
29-29.9	0.90	38-38.9	1.26
30-30.9	0.96	39-39.9	1.29
31-31.9	1.02	40-40.9	1.32
32-32.9	1.08	41-41.9	1.35
33-33.9	1.11	42-42.9	1.38
34-34.9	1.14	43-43.9	1.41
35-35.9	1.17	44 and above	1.44

**Cotton Valley, below 36, $0.80. Beginning with 36-36.9, same schedule as above.

Smackover, below 24.....$0.85
do 24 and above..... 1.00
Bellevue (Jan. 16, 1930)..... 1.05
*Urania, La. (Jan. 16, 1930)..... 0.85
†East El Dorado..... 0.75

*Posted by Louisiana Oil Refining Corp.
†Posted by Magnolia Petroleum Co.

Jan. 15, 1930, The Texas Co. same schedule in Louisiana as Standard, plus these grades: 24-24.9, $0.60; 25-25.9, $0.66; 26-26.9, $0.72; 27-27.9, $0.78.

Jan. 16, Magnolia, Louisiana Oil, and Gulf Companies met Standard schedule in Louisiana-Arkansas fields.

STEPHENS, ARKANSAS

Louisiana Oil Refining Corp., and Atlantic Oil Producing Co.

Effective Jan. 16, 1930

Below 28	$0.70	30-30.9	$0.85
28-28.9	0.75	31-31.9	0.90
29-29.9	0.80	32 and above	0.95

GULF COASTAL

Posted by Humble Oil & Refining Co.

Effective Jan. 15, 1930

Grades A	$1.05	29-29.9	$1.05
Grades B:		30-30.9	1.08
Below 25	0.90	31-31.9	1.11
25-25.9	0.93	32-32.9	1.14
26-26.9	0.96	33-33.9	1.17
27-27.9	0.99	34-34.9	1.20
28-28.9	1.02	35 and above	1.23

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling, Pierce Junction, Sugarland and Raccoon Bend. All other fields are Grades A only

Crude Price Changes

LOUISVILLE.—On Feb. 19 Stoll Oil Refining Co. reduced prices of Oil City, Ky., crude in its lines 10 cents per barrel, making new price $1.45 at the well.

91 Cents Is Top Gasoline Price in World

WASHINGTON—The highest price paid for a gallon of gasoline in recent years, in tabulations of world gasoline prices by the minerals division of the Bureau of Foreign and Domestic Commerce, is 91 cents. That price was being paid by consumers in Addis Ababa, Ethiopia on Sept. 30, 1929, according to circular No. 726, recently released by the bureau.

The highest kerosene price among the 90 points listed in the tabulation was 72 cents per gallon at Georgetown, British Guiana. Gasoline there retailed at 61 cents.

Compared with the end of 1928, gasoline prices reflect downward revisions at some points, while at other points where prices had been below normal, there were upward revisions.

In the United States at the end of September, the highest gasoline price among the 150 points published in the tank wagon table of NATIONAL PETROLEUM NEWS, was 28.5 cents, including 5 cent state tax, at Butte and Helena, Mont.

The highest kerosene price on that date was 20.5 cents at Phoenix, Ariz.

When making any comparisons of the world prices, the bureau of Foreign and Domestic Commerce cautions that various factors which tend to make inequalities in prices must be taken into consideration, such as transportation costs, import duties, excise taxes, distance from source of supply, distribution and marketing costs.

No service too severe—no specifications too high. No product bearing our name is permitted to reach the hands of a customer until it first meets our own rigid tests.

Build your business on our reputation for satisfactory petroleum products.

Empire Oil & Refining Company

Subsidiary Cities Service Co.

GENERAL SALES OFFICES—TULSA, OKLA.

NEW YORK PHILADELPHIA CLEVELAND CHICAGO ST. PAUL
KANSAS CITY ST. LOUIS FT. WORTH TORONTO

Crude Oil Prices (in Effect Feb. 24, 1930)

(Crude Oil Prices for the whole year in OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

Effective Jan. 15, 1930

Grades A	$1.05	*Grades B	$0.90
‡Grades B (light crude)			
35–35.9	$1.23	40–40.9	$1.36
36–36.9	1.26	41–41.9	1.38
37–37.9	1.29	42–42.9	1.40
38–38.9	1.32	43–43.9	1.42
39–39.9	1.34	44 and above	1.44

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on all oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co., and Midwest Refining Co.

(Salt Creek prices effective Feb. 15, 1930)

‡Salt Creek 29–29.9	$0.90
" " 30–30.9	0.96
" " 31–31.9	1.02
" " 32–32.9	1.08
" " 33–33.9	1.11
" " 34–34.9	1.14
" " 35–35.9	1.17
" " 36–36.9	1.20
" " 37 and above	1.23
Elk Basin	1.45
Grass Creek light	1.45
Big Muddy	$1.33
Lance Creek	1.53
Rock Creek	1.25
Mule Creek	1.20
Rex Lake	1.10
‡Osage	1.65
‡Cat Creek, Mont	1.45
Sunburst, Mont	1.65
‡Hogback, N. Mex	1.70
Artesia, N. Mex	1.00

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

CALIFORNIA

***Standard Oil Co. of California**

Gravity	Alamitos Heights Huntington Beach Signal Hill Seal Beach	Inglewood Torrance	Olinda-Brea Canon †Richfield	Athens-Rosecrans Dominguez	Elwood Terrace	Whittier La Habra	Coyote Hills	Santa Fe Springs	Newhall McKittrick Kern River	Midway Sunset Buena Vista & Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Montebello	Kettleman Hills	*Santa Maria (Orcutt)	*Ventura
14–14.9	$ .70	$ .70	$ .70	....	....	$ .70	$ .70	....	$ .50	$ .50	$ .50	$ .50	$ .50	$ .70	....	$ .65	$ .70
15–15.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
16–16.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
17–17.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
18–18.9	.75	.75	.75	....	....	.75	.75	....	.50	.56	.56	.56	.56	.70	....	.70	.75
19–19.9	.80	.80	.80	....	....	.80	.80	....	.50	.62	.62	.62	.62	.75	$1.65	70	.80
20–20.9	.85	.85	.85	....	....	.84	.84	....	....	.68	.68	.68	.68	.80	for	.70	.85
21–21.9	.89	.89	.89	....	....	.88	.88	.89	....	.74	.74	.74	.74	.85	55°	.86	.86
22–22.9	.93	.93	.93	....	....	.91	.91	.92	....	.80	.80	.80	.80	.90	gravity	.87	.87
23–23.9	.97	.97	.97	....	....	....	.94	.95	....	.85	.85	.85	.85	.95	and	.90	.90
24–24.9	1.01	1.01	1.01	1.01	....	....	.97	.98	....	.90	.90	.88	.88	.98	over	.94	.94
25–25.9	1.05	1.05	1.05	1.05	....	....	1.00	1.01	....	.95	.95	.91	.91	1.01	....	.98	.98
26–26.9	1.09	1.09	1.09	1.09	....	....	1.04	1.04	....	1.00	1.00	.94	.94	1.04	....	1.02	1.02
27–27.9	1.13	1.13	1.13	1.13	....	....	1.08	1.07	....	1.05	1.05	.98	.97	1.07	....	....	1.06
28–28.9	1.17	1.17	1.17	1.17	....	....	1.12	1.10	....	1.10	1.10	1.02	....	1.10	....	....	1.10
29–29.9	1.21	....	1.21	1.21	....	....	1.16	1.15	....	1.16	1.16	1.06	....	1.13	....	....	1.14
30–30.9	1.25	....	1.25	1.25	....	....	1.20	1.20	....	1.22	1.22	1.10	....	1.16	....	....	1.18
31–31.9	1.30	....	1.30	1.30	....	....	....	1.25	....	1.28	1.28	1.14	....	....	....	....	1.23
32–32.9	1.35	....	....	1.35	....	....	....	1.30	....	1.34	1.34	1.18	....	....	....	....	1.28
33–33.9	....	....	....	1.41	....	....	....	1.35	....	1.40	1.40	1.22	....	....	....	....	1.34
34–34.9	....	....	....	1.47	$1.16	....	....	1.40	....	....	1.46	1.26	....	....	....	....	....
35–35.9	....	....	....	1.53	1.22	....	....	1.45	....	....	1.52	1.30	....	....	....	....	....
36–36.9	....	....	....	1.59	1.28	....	....	1.50	....	....	....	....	....	....	....	....	....
37–37.9	....	....	....	1.65	1.34	....	....	1.55	....	....	....	....	....	....	....	....	....
38–38.9	....	....	....	1.71	1.40	....	....	1.60	....	....	....	....	....	....	....	....	....
39–39.9	....	....	....	1.77	1.46	....	....	1.65	....	....	....	....	....	....	....	....	....
40–40.9	....	....	....	1.83	1.52	....	....	....	....	....	....	....	....	....	....	....	....
41–41.9	....	....	....	1.89	1.58	....	....	....	....	....	....	....	....	....	....	....	....
42–42.9	....	....	....	1.95	1.64	....	....	....	....	....	....	....	....	....	....	....	....

*Santa Maria and Ventura postings are by Union Oil Co. Union Oil Co. posts same prices in all above fields as Standard except it does not post prices in Wheeler Ridge, Whittier, La Habra, Newhall and Kettleman Hills. Standard does not contract for crude testing 11-13.9 gravity, but pays 45c a barrel when purchased.

†Richfield posted only to 30-30.9 at $1.25.

REFINERS' and COMPOUNDERS' SUPPLIES

Following are average market prices for materials used by refiners and compounders effective on the date shown.

Refiners' Supplies

	Feb. 24	Feb. 17
Soda Ash light 58% bags, cwt.	$1.32	$1.32
Silicate of Soda 60 deg. drums, cwt.	$1.55	$1.55
Silicate of Soda 40 deg. tank cars, cwt.	$0.60	$0.60
Silicate of Soda 40 deg. drums cwt.	$0.80	$0.80
Sal Soda wks.	$1.00–1.05	$1.00–1.05
Caustic Soda 76% solid, cwt.	$2.90	$2.90
Sulfuric Acid 60 deg. tank cars, f.o.b. shipping point per ton	$11.00	$11.00
Oleum 20%, fuming sulfuric, tank cars, wks.	$18.50	$18.50
Sulfur, flowers of, cwt.	$3.10–4.00	$3.10–4.00
Liquid Chlorine, tank cars, wks., lb.	3.50–5.00	3.50–5.00

Compounders' Supplies

	Feb. 24	Feb. 17
Vegetable Oils		
Linseed carloads, spot, lb.	14.20	14.20
Tanks, spot	13.40	13.40
Soya Bean, Tank, coast, lb.	9.00–9.50	9.00–9.50
Oleic Acid		
Distilled, tanks, lb.	9.25–9.50	9.25–9.50
Distilled, bbls., lb.	10.125-10.375	10.125-10.375
Saponified, tanks, lb.	9.25	9.25
Saponified, bbls., lb.	10.125–10.625	10.125-10.625
Lard Oils		
Prime Winter Strained, lb.	13.50	13.50
Extra Winter Strained, lb.	12.50	12.50
Extra, lb.	12.00	12.00
Extra No. 1, lb.	11.25	11.25
No. 1, lb.	11.00	11.00
No. 2, lb.	10.75	10.75
Tallow oil, lb.	10.50	10.50
Neatsfoot Oil		
Pure, bbls., lb.	13.50	13.50
Extra, bbls., lb.	11.50	11.50
No. 1 bbls., lb.	11.00	11.00
Cold Pressed, lb.	18.00	18.00
Fish Oils		
Menhaden Oil		
Light Pressed, gal.	63–65	63–65
Light Pressed, tank cars, N. Y., gal.	53	53
White bleached, gal.	67	67
Yellow bleached, gal.	61	64
Whale, extra winter bleached, gal.	85	85
Naval Stores		
Steam, distilled turpentine, N. Y., gal.	51	51
Steam distilled turpentine, Savannah, gal.	46	46
Gum turpentine, N. Y., gal.	57	57
Gum turpentine, f.o.b. cars Savannah, gal.	50.50	50.50
Wood Rosin, N.Y., gal.	$7.50	$7.50
Wood Rosin F, Savn'h, bbl	$6.70	$6.70
Gum Rosin B, N. Y., bbl	$8.20	$8.80
Gum Rosin B, f.o.b. cars Savannah, bbl.	$7.10	$7.20
Rosin oil, pure, gal.	60	60
Rosin oil, compounded, gal.	60	60
Pine Tar		
Kiln burnt, bbl.	$11.00–13.00	$11.00–13.00
Retort, bbl.	$13.50–14.50	$13.50–14.50
Alcohol		
Denatured Formula 5, in bbls., per gal.	57–64	58–62

Celebrates Fifth Birthday by Move to New Offices

NEW YORK, Feb. 20

THE Seaboard Midland Petroleum Corp., and the Seaboard Terminals Corp., of Baltimore, recently moved their offices from the Munsey building to the new Baltimore Trust building, located on Baltimore, Redwood and Light streets. Five years, the age of the two companies, had been spent in the old Munsey building.

They occupy most of the 29th floor in the tower. In keeping with the new quarters, new furniture and fixtures have been installed.

Vice presidents J. I. Hopkins and F. Y. Borden, the latter in charge of sales, have a joint office with windows facing the south. It is a large spacious room, extending over the front half of the leased space. J. H. Foster, president of the two companies maintains offices at 17 Battery Place, New York City.

The office of Messrs. Borden and Hopkins, affords an excellent view. On a clear day the company's acreage and equipment at Curtis Bay, Md., six mile away, can be seen. The airplane photograph reproduced here shows the company's tanks which aggregate 14,000,000 gallons storage capacity, and a portion of the 150 acres of land the company owns in the bay section.

The Seaboard Midland Petroleum Corp. is a distributor of gasoline, principally California goods. The terminals corporation stores gasoline for several companies as well as its own.

Heads Sales After Eight Years of Selling

MILWAUKEE, Feb. 20.—John A. Sheridan, formerly a salesman, has been made general sales manager of the O'Neil Oil Co. here, according to Clyde H. Fuller, president.

Mr. Sheridan succeeds James S. Harrison who has been placed at the head of a new research and technical department recently established.

Beginning as a salesman for the company in 1922, Mr. Sheridan has covered the lake shore territory until a year ago when he was made field manager for Wisconsin, Illinois, Michigan, Minnesota and Iowa. He will be in complete charge of the marketing of gasolines, oils, greases, denatured alcohol, linseed oil and turpentine.

John A. Sheridan

F. C. Bellis Co. Sold To S. O. New York

WORCESTER, Mass., Feb. 21.—Sale of the F. C. Bellis Co. here recently to the Standard Oil Co. of New York marked the passing from the oil picture of one of the best known Independent jobbers in New England.

Frank C. Bellis, who organized the company in 1920 with Albert R. Tattersall, is a former president of the Independent Oil Men's Association of New England, and Mr. Tattersall is present head of that organization.

The sale included 17 service stations, 14 of which are in Worcester, and one each in Clinton, Spencer and Millbury, Mass. Purchase price was reputed to be over $1,000,000.

Previous to organizing his own company, Mr. Bellis was with the E. A. Buck Oil Co., which was sold in 1919 to the Tide Water Oil Co., New York.

Both Mr. Bellis and Mr. Tattersall intend to take vacations, and future plans have not yet been announced.

Sherwood Bros. Move Offices

BALTIMORE — Headquarters of Sherwood Bros., Inc., were moved early in February to the new Baltimore Trust Bldg. here, of which the company will occupy the entire fourteenth floor.

Expansion of the company's business caused the move. Late last year the Sherwood company became affiliated with the Richfield Oil Co. of California, and has since that time erected a plant and water terminal at Baltimore and Philadelphia and more recently purchased the Philadelphia branch of the Peerless Oil Co., including 45 stations.

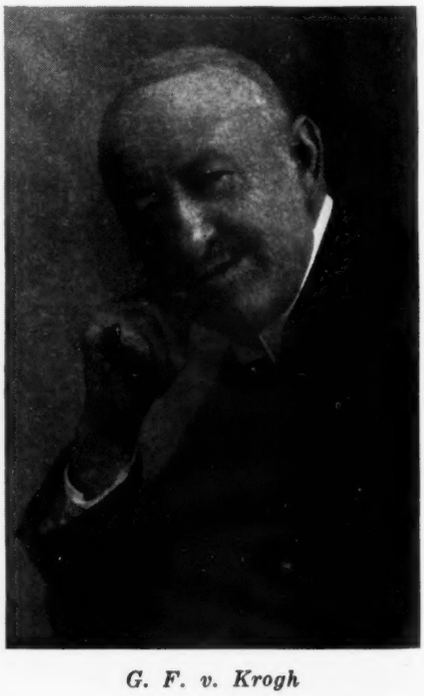
John W. Sherwood is president and his son, John R., is vice president.

CLEVELAND—Among the latest super service stations to be opened by the Standard Oil Co. of Ohio is the one at Springfield, O. It is similar in architecture to the other super stations built by this company and has a lubritorium with four lifts. Frank Good, formerly instructor, is manager of the station.

Sells Pennsylvania Lubes In Europe 42 Years

HAMBURG, Feb. 21.—Among the first oil men to introduce Pennsylvania lubricating oils to European markets was G. F. v. Krogh, general manager of the Eagle Oil Co. of New York, and Hamburg, Germany. Although 68 years old, Mr. v. Krogh is still going strong. He has spent 42 years in the oil business at Hamburg.

Among the refiners he has represented at various times since 1888 are the Emry Mfg. Co., Bradford, Pa., now out of business; Seneca Oil Works, Warren; Levi Smith Refining Co., Clarendon; Crystal Oil Works, Oil City; and Empire Oil Works, Oil City.



G. F. v. Krogh

Test the Niagara Gasoline Meter for Accuracy, Long Life and Simplicity

HAVE you seen the new 1930 model Niagara Gasoline Retailing Meter? Did you test it, take it apart, study it and compare it with any other type?

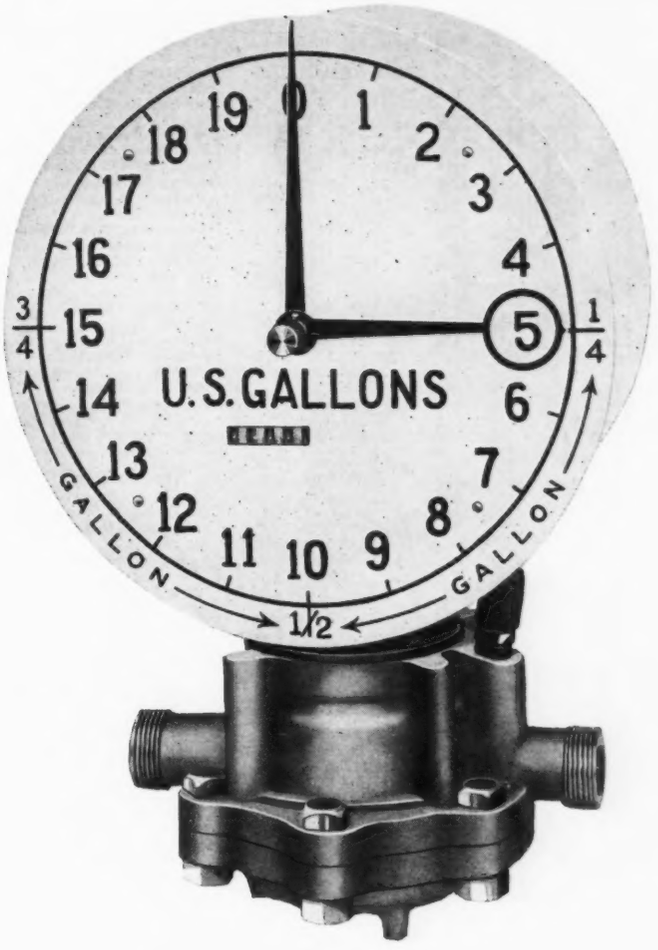
You will notice several essential features in the Niagara Meter that have made it a proved success:

1. The Niagara is a positive displacement meter of the nutating piston type. This is the standard principle of meter construction, that won its recognition by inherent superiority.
2. The accuracy of the Niagara Meter is uniform and sustained. There are no temporary parts to need renewal periodically, for the meter is made of metal thruout. Specially hardened metal bearing surfaces assure long life—undiminished accuracy.
3. The simplicity is remarkable—so few parts! The nutating piston, the spherical piston chamber and the gears that drive the dial hands; these comprise the meter. There are no valves, no sliding surfaces to wear rapidly.
4. Quantity production and nutating piston simplicity have long ago reduced the price of Niagara Gasoline Meters to the point where no meter pump manufacturer can afford to overlook their economy.

There are no long waits this year in obtaining delivery of Niagara Gasoline Retailing Meters. The largest orders can be filled without delay or sacrifice of quality, by our enlarged facilities and manufacturing stocks.

Write for full information, samples and cooperation in solving your metering problems.

BUFFALO METER COMPANY
2889 Main Street Buffalo, N.Y.



Niagara Meters

The factory of the Buffalo Meter Company is devoted exclusively to the manufacture of nutating piston meters.

Transactions in Oil Shares on New York Stock Exchange

1928 High	1928 Low	1929 High	1929 Low	Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Feb. 22 Sales	First	High	Low	Last	Change
43⅞	27⅛	42⅝	17½	(sh) 922,075	N.P.	Amerada Corp.	50cQ	Jan. 31, 30	6,800	18¼	18½	18⅛	18⅛	— ⅛
85	51¼	64¾	12½	(sh) 209,180	N.P.	American Republics Corp.	....	.....	3,000	22	23¾	22	23¾	+ 1½
53¾	37½	47¼	33½	$56,000,000	$25	Associated Oil.	50cQ	Dec. 31, 29	180	33	33	33	33	— 1½
62½	50	77⅞	30	50,000,000	25	Atlantic Refining.	‡25cQ	Dec. 16, 29	19,400	39¼	39¼	37¾	38½	— ⅜
53	20	49⅛	20	47,261,125	25	Barnsdall Corp. A.	50cQ	Feb. 7, 30	2,400	20⅝	21½	20½	21⅜	+ ⅜
51⅛	20	49	38⅛	300,525	25	do B.	50cQ	Feb. 7, 30	.....	.....	.....	.....	.....	.....
24½	12¼	32⅞	13	(sh) 956,075	N.P.	Beacon Oil.	....	.....	2,400	13½	14⅛	†13	14⅛	0
36	25¼	34½	25	$51,524,150	$25	California Petroleum	....	Jan. 1, 29	10	28	28	28	28	0
.....	....	37¾	18	(sh) 4,634,163	N.P.	Continental Oil (Delaware)	....	.....	32,300	20⅛	20½	19½	20¼	— ⅛
94⅞	68	94¾	42¼	21,031,400	100	General Asphalt	$1Q	Dec. 16, 29	5,400	54¾	55⅛	52	54	— 1
141	110⅛	138	103½	6,628,200	100	do pfd.	$1.25Q	Dec. 2, 29	.....	.....	.....	.....	.....	.....
67	79	109	23	25,000,000	100	Houston Oil.	....	.....	18,300	62	64½	59¼	63	+ ⅜
38⅝	21¾	39¼	17¾	(sh) 1,333,157	N.P.	Independent Oil & Gas.	50cQ	Jan. 31, 30	11,900	21	21	20¼	21	0
39⅝	9	53	13	$4,299,190	$10	Indian Refining.	....	Dec. 15, 20	19,300	19	20⅛	18⅝	20¼	+ 1⅛
37¼	8½	51¼	11½	4,550,110	10	do ctfs.	....	.....	9,300	18¼	19½	17⅝	19	+ ⅝
185	140	165	160	1,977,700	100	do pfd. new.	$1.75Q	Jan. 1, 30	.....	.....	.....	.....	.....	.....
39⅛	27⅜	38⅜	16½	3,992,387	N.P.	Lago Oil & Transport.	....	May 2, 27	4,800	22¼	22½	22⅛	22⅛	0
119¾	9⅜	18	7	(sh) 1,187,298	N.P.	Louisiana Oil Refining.	....	.....	6,900	8⅝	8¾	8	8½	— ⅛
96	78	100¼	80	$4,000,000	$100	do pfd.	$1.62½	Feb. 15, 30	.....	.....	.....	.....	.....	.....
25½	12½	18½	5⅛	(sh) 330,000	N.P.	Maracaibo Oil.	....	.....	500	5½	5½	5½	5⅛	0
360	250	295	176	$45,942,800	$100	Mexican Petroleum.	$3Q	Jan. 20, 30	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	12,000,000	100	do pfd.	$2Q	Jan. 20, 30	.....	.....	.....	.....	.....	.....
73	4⅝	69⅜	9¼	(sh) 995,500	N.P.	Mexican Seaboard.	....	Nov. 15, 24	54,600	17¼	20¾	16¾	20½	+ 2⅜
44½	25⅞	39⅞	22⅛	(sh) 1,857,461	N.P.	Mid-Continent.	50cQ	Feb. 15, 30	9,800	24¾	24¾	24	24¼	— ⅛
120½	103¼	121	120¼	$6,718,000	$100	do pfd.	$1.75Q	Dec. 1, 29	.....	.....	.....	.....	.....	.....
7⅜	2⅜	5⅛	¾	23,849,720	10	Middle States.	....	July 1, 23	.....	.....	.....	.....	.....	.....
5⅞	1½	3⅝	⅞	5,950,500	10	do ctfs.	....	.....	4,300	1	1⅛	1	1	0
2¼	1	1½	⅝	(sh) 3,500,000	N.P.	Pacific Oil.	....	.....	9,100	1⅛	1¼	1⅛	1⅛	0
55½	38¼	69	40¼	$50,000,000	$50	Pan American P. & T.	....	Oct. 20, 27	1,200	52	52	51⅝	57⅝	— 1⅛
58⅞	37¾	69¼	40½	121,101,400	50	do B.	....	Oct. 20, 27	8,900	52¾	52¾	51⅝	57⅝	— 1⅛
28⅜	15½	17½	13½	(sh) 400,000	N.P.	Pan. American Western B.	....	Jan. 30, 27	.....	.....	.....	.....	.....	.....
21⅜	11½	15¼	3	(sh) 199,370	N.P.	Panhandle P. & R.	....	.....	400	4½	4⅝	4¼	4¼	+ ⅛
106¼	70	76	47½	$2,935,200	$100	do pfd.	....	July 2, 23	400	50	50	49⅞	50	+ 2½
53⅞	35¼	47	24¼	(sh) 2,406,803	N.P.	Phillips Petroleum.	‡50Q	Jan. 2, 30	14,200	29⅞	30⅜	29⅛	30⅜	+ ⅛
5¼	½	3⅜	1	$29,622,925	$25	Pierce Oil Corp.	....	.....	16,000	1⅛	1⅜	1¼	1⅜	+ ⅛
50	16¼	51½	20	15,000,000	100	do pfd.	....	Feb. 1, 22	1,900	22⅜	27	22⅝	24	+ 2
6⅝	3½	5⅞	½	(sh) 2,500,000	N.P.	Pierce Petroleum.	....	.....	17,700	2½	3⅜	2½	3	+ ⅛
64⅝	59½	65⅝	40½	$60,636,450	$25	Prairie Oil & Gas.	‡50cQ	Dec. 31, 29	5,700	48⅛	48½	48	48	— ⅛
.....	....	65	45	101,250,000	25	Prairie Pipe Line.	‡76cQ	Dec. 31, 29	2,200	58⅜	59⅞	58¾	59⅛	+ ⅛
29⅞	16	25⅞	4	37,450,850	50	Producers & Refiners.	....	Sept. 15, 23	1,700	6½	7	6½	7	+ ⅛
49⅜	41	46¾	25½	2,845,350	50	do pfd.		May 1, 25	90	31	32	31	31	0
31¼	19	30¾	20	75,959,255	25	Pure Oil Co.	37½cQ	Dec. 16, 29	17,000	22⅛	22¼	21⅝	21⅝	— ⅛
119	108	116	108	13,000,000	100	do 8% pfd.	$2Q	Jan. 2, 30	70	113½	113½	113	113	— ½
56	23½	49⅝	20	47,127,725	25	Richfield Oil.	50cQ	Feb. 15, 30	5,800	22⅞	23⅞	22¼	23⅞	+ ⅞
.....	....	42½	15	(sh) 1,200,000	N.P.	Rio Grande Oil Co.	50cQ	Jan. 25, 30	23,700	17⅜	18⅝	16½	18⅝	+ 1⅛
64	44⅝	64	43⅛	(sh) 546,646	$13.40	Royal Dutch N. Y. shares.	$1.3415	Feb. 5, 30	28,800	51⅛	51⅝	49¼	50½	— ⅞
57½	39⅜	55¾	43	(sh) 65,203,000	£2	Shell Transport & T.	97c	Jan. 28, 30	110	44¼	44⅜	42¼	43¼	— 2⅛
39⅜	23¼	31⅝	19	12,254,979	N.P.	Shell Union Oil.	35cQ	Dec. 31, 29	13,800	22¼	22¼	21	21¾	— ⅛
27¼	18⅛	40⅜	15	$8,357,280	$10	Simms Petroleum.	40cQ	Feb. 28, 30	3,400	24	24½	23	24½	+ ⅜
46¾	17⅜	45	21	5,494,095	N.P.	Sinclair Consolidated.	50cQ	Jan. 15, 30	58,000	22⅛	22⅞	21⅝	23	+ ⅜
110	102½	111	103	$16,025,200	$100	do pfd.	$2Q	Feb. 15, 30	300	109	109	109	109	— 1
42⅝	25	46½	28	27,396,590	25	Skelly Oil Co.	50cQ	Dec. 16, 29	10,000	29¼	29¼	28⅞	29	— 1
80	53	81⅞	51½	(sh) 13,016,435	N.P.	S. O. California.	‡62½cQ	Dec. 16, 29	34,200	57⅞	59	55½	58¼	+ ⅝
59¾	37¾	83	48	$612,095,850	$25	S. O. New Jersey.	‡25cQ	Dec. 16, 29	131,800	59½	60¼	58	59⅛	— ⅞
45½	28¾	48⅛	31¼	434,094,575	25	S. O. New York.	40cQ	Dec. 16, 29	34,400	32	32¼	†31¼	31½	— ¾
77	31½	84¾	53	(sh) 1,297,847	N.P.	Sun Oil.	‡25cQ	Dec. 16, 29	2,200	56	56	†53	53	— 3
110	110	105½	100	$5,000,000	$100	do pfd.	$1.50Q	Dec. 2, 29	450	103	103¼	102¾	102¾	— ¼
14¼	2½	24	5¼	(sh) 1,304,698	N.P.	Superior Oil Corp.	....	Dec. 20, 20	6,200	5½	5½	5¼	5½	0
74⅝	50	71⅜	50	$211,082,925	$25	The Texas Corp.	75cQ	Jan. 1, 30	26,600	52⅛	52⅛	51	51½	— ¾
26⅝	12⅛	23⅞	9⅛	8,380,340	10	Texas Pacific Coal & Oil.	2½%	Dec. 31, 29	4,300	9⅜	9½	†9⅛	9¼	0
41½	19⅝	40	14	(sh) 2,179,275	N.P.	Tide Water Oil Co.	20cQ	Dec. 31, 29	.....	.....	.....	.....	.....	.....
100⅛	86¾	97½	85⅛	$20,321,000	$100	do 5½% pfd.	$1.25Q	Feb. 15, 30	500	...	87½	86½	87½	+ 1⅜
25	14¾	23½	10	(sh) 4,877,976	N.P.	Tide Water Associated.	30cQ	Feb. 15, 30	21,000	10⅞	11¼	10¾	11	+ ⅛
91¾	81⅞	90⅞	74½	$72,989,200	$100	do pfd.	$1.50Q	Jan. 2, 30	500	86⅝	79⅝	78⅛	78⅝	— 1⅜
14½	6¾	15¼	5⅛	(sh) 3,842,029	N.P.	Transcontinental Oil.	....	.....	57,200	8½	8½	7⅞	8	— ⅛
58	42¾	54½	41⅛	$40,858,375	$25	Union Oil of California.	‡50cQ	Feb. 10, 30	11,200	42⅜	42¾	†41⅛	42½	+ ⅛
128¼	110	163¾	121⅞	31,101,200	100	Union Tank Car Co.	$1.25Q	Dec. 2, 29	3,500	34½	35½	33⅞	33⅞	— 1⅝
44⅞	26	42⅞	15	(sh) 488,359	N.P.	Warner Quinlan.	50cQ	Jan. 2, 30	12,900	19⅞	19⅞	18	18¼	— 1⅛
38	20⅛	38	25	(sh) 490,000	N.P.	White Eagle Oil & Refining.	50cQ	Jan. 20, 30	1,000	26¾	26¾	26½	26½	— ½
22⅛	17¼	29¾	11¾	(sh) 428,967	N.P.	Wilcox Oil & Gas.	..	May 10, 28	1,100	13	13	†11¾	12½	— 1

*New High †New Low xEx-Dividends ‡Also Extras s-Stock Total Sales 801,110

Tank Wagon Tables

(Continued from Page 117)

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

	Gasoline T.W.	Gasoline Tax	Gasoline Total T.W.	Gasoline S.S.	Oil T.W.
ONTARIO					
Toronto	19.5	5	24.5	28	20.5
Ottawa	19.5	5	24.5	28	20.5
Cochrane	24.5	5	29.5	..	25.5
Ft. William	22.5	5	27.5	31	22.5
Border Cities, including Windsor	18.5	5	23.5	27	19.5
MANITOBA					
Winnipeg	21.5	3	24.5	28	21.5
SASKATCHEWAN					
Regina	26	3	29	33	26
ALBERTA					
Edmonton	27.5	5	32.5	36	27.5
Calgary	23.5	5	28.5	32	23.5
BRITISH COLUMBIA					
Vancouver	23	3	26	30	24
QUEBEC					
Montreal	20.5	5	25.5	29	21.5
Quebec City	21.5	5	26.5	30	22.5
Three Rivers	21.5	5	26.5	30	22.5
NEW BRUNSWICK					
St. John	22	5	27	31	24
Moncton	22	5	27	31	24
NOVA SCOTIA					
Halifax	22	5	27	31	24
Sydney	22	5	27	31	24
PRINCE EDWARD ISLAND					
Charlottetown	22	5	27	31	24

Note: In districts surrounding these points 1c additional is added to city price.

Cleveland Stock Market

Feb. 21, 1930

	Par Value	Bid	Asked
Canfield Oil Co.	$100	100	135
Fred G. Clark	10	9	10½
National Refining Co.	25	33	34
do pfd.	100	...	135
Paragon Refining Co.	25	7½	7¾
do pfd.	N.P.	..	35
do ctfs.	..	..	8⅝

George B. Murphy with Dubbs

CHICAGO, Feb. 22.—George B. Murphy, for the past five years with the Atlantic Refining Co., has resigned to join the staff of the Universal Oil Products Co. He will assume his new duties on Mar. 1 as a sales engineer.

Since 1927 Mr. Murphy has been supervising engineer for cracking. Previously he was in the process department. Before joining the Atlantic staff he was employed by the Mid-Continent Petroleum Corp. at Tulsa.

Pittsburgh Curb Market

Transactions Week Ended Feb. 21, 1930

	Sales	High	Low	Last	Change
Arkansas Gas A.	1,358	13⅛	11⅝	11⅝	—2⅛
Gulf Oil	300	138	138	138	....
Phoenix Oil	1,000	.25	.25	.25—c	.05

Pittsburgh Stock Exchange

Transactions Week Ended Feb. 21, 1930

	Sales	High	Low	Last	Change
Ark. Nat. Gas	1,105	13¼	12	12½	— ¾
do pfd.	475	8	7⅞	7⅞	— ⅛
Devonian Oil	665	9⅞	9½	9¾	— ⅛
Lone Star Gas	2,125	38¼	36¾	37	—1
do pfd.	55	105½	105½	105½	0
Plymouth Oil	520	27	26	26½	0
Pgh. Oil & Gas	50	3	3	3	0
Salt Creek Cons.	100	2⅛	2⅛	2⅛	+ ⅛
Shamrock Oil & Gas	7,145	*20¼	18¾	19¾	+1¾

*New High.

DOTHAN, Ala.—W. T. Jones, who has been agent here for The Texas Co. for the past 14 years, was made representative for zone 20 on Jan. 1, with headquarters at Dothan.

"Stop Worrying Over Wall Street," Dealers Urged

GREENSBORO, N. C.—A good stimulating sales letter recently was sent to all its dealers by L. H. Martin, Inc.

"We have personally maintained the position that, while many of the dealers perhaps did not know it as such, psychology was playing an important part in slowing up a recovery of business to normal conditions," said L. H. Martin, president of the company, in discussing the letter.

"In an effort to put courage into the hearts of our dealers, we sent this letter to them all and, while the thought was not original, we were convinced it would be beneficial to our trade to find out just what was necessary of them if they expect the present year to be beneficial.

"Now that the Headache's Over—Let's Go to Work," starts out this sales letter, which reads:

"Stop talking and worrying about the folks in Wall Street. Only 5 per cent of our people lost money in the stock crash.

"The public will go on wearing out tires, purchasing radios, eating breakfast foods and buying new cars, just as before.

"They'll still 'drive a mile for Quaker State'—move into the suburbs for more air for the baby, and take an evening off for the talkies—in the future as in the past.

"They'll go on dreaming and earning and buying in that lavish fashion that has always characterized the shortest-memoried and the longest-confidenced people that ever lived.

"They'll continue to constitute, for the dealers who deserve it, the Biggest, Richest, Most Responsive Market in the World.

"Many of us have 'Reached for something lucky, instead of a good sweat.' Now let's go to work.

"Start today by sending us a list of car owners and we'll go to work with you, telling them, by means of a personal letter, to buy their Quaker State oil from you.

"You can make 1930 a good year if you will go to work.

"We are with you 100 per cent, and that means more than just oil."

BIRMINGHAM, Ala., Feb. 20.—Edgar G. Hill has been appointed vice-president and general manager of the Southern Natural Gas Corp. The new official of the gas line which brings natural gas from Monroe, La., to Birmingham, Ala., and Atlanta, Ga., has been vice president of Ford, Bacon & Davis, Inc., who designed and constructed the gas line. Mr. Hill is an engineer of extensive experience in natural gas transmission line construction.

THE OIL INDUSTRY EXCHANGE

Positions Wanted

MANAGER OF WHOLESALE GASOLINE AND OIL PLANT desires new connection. Have had several years experience. References furnished on request. Southern district preferred. Address Box 154, Wellington, Ontario, Canada.

REFINERY SUPERINTENDENT with ten years experience refining gasoline, kerosene and fuel oils including cracking, desires connection. References. Address Box 492.

ADVERTISING AND SALES PROMOTION EXECUTIVE

with background of well diversified experience in oil industry, including six years in selling and advertising, seeks connection with oil company as advertising or sales promotion manager. Age thirty-two.

Address Box 500
c/o National Petroleum News

SALESMAN—EXECUTIVE—age 35 years, with major oil company experience in sales and land departments, desires state sales connection with large refinery or supply company or in land department with oil company. Want headquarters at Ada—the ideal city for factory sites. Address Box 331, Ada, Okla.

SALES EXECUTIVE AVAILABLE

A man with several years experience as a director of sales will be available about Jan. 15. Has personally sold as well as directed sales of gasoline, motor oils and grease to the jobbing trade. Has had unusual experience in compounding and managing grease and oil compounding plants. Still under forty-five years of age, healthy, am in a position to travel anywhere.

Address Box 468
c/o National Petroleum News

Situations Open

SALESMAN—Man capable of handling refinery sales of Western Stocks and Neutrals, Ohio and Michigan territory. Do not apply unless you are willing to accept compensation on basis of results. Address Box 499.

DRAFTSMEN

Thoroughly experienced on Oil Refinery Work, to Lay Out, Design and Check. Permanent Positions offered to qualified applicants. Submit full details in first letter. Location in Ohio.

Box No. 473

EXPERIENCED SALESMEN

are needed by an old refiner of highest grade nationally advertised Pennsylvania oils to pioneer several territories in Southeastern States now undeveloped.

Only men of good education and proved ability between ages of 25 and 45 need apply; must own car; oil experience preferred but not required; in writing state fully all qualifications if a reply is expected; your application will be quite confidential; salary, commission, expenses.

Address Box 501

Situations Open

SALES EXECUTIVE

Young man who has successfully developed sales with major oil companies. Prefer man who has handled equipment for use in gasoline filling stations.

MARNALL STEEL PRODUCTS, INC.
501 Fifth Ave. New York City

For Sale

FOR LEASE OR SALE: 200-CAR GARAGE, storage, tires, batteries, washing, accessories. Sale of repossessed cars. A-1 Service Station with maximum profit on gasoline. In heart of prosperous manufacturing city near Chicago. 60,000 population. Owner in manufacturing business and cannot devote time. Opportunity out of the ordinary. Investigate! Address: Box 133, Aurora, Ill.

LIQUIDATION SALE OR LEASE

Complete Bulk Plant, one acre of ground in city limits of City of 55,000 population. 80,000-gal. gasoline storage capacity, 18,000-gal. oil storage. On Penn. R.R. and State Highway.

Also one Graham Bros. 2-ton six cylinder, four speeds forward, dual rear wheel Truck, with three comp. 700-gal. tank. One International 1½-ton truck with 630-gal. tank, three compartments. One Ford 1-ton Truck with both Stake Body and 350-gal. tank. A number of separate Truck Tanks, various sizes, also 5-gal. side rack cans and tank wagon buckets. Some 550-gal. underground storage tanks.

Address P.O. Box 66, Lima, Ohio.

Patent Attorneys

INVENTORS who derive largest profits know and heed certain simple, but vital facts before applying for patents. Our book, Patent Sense, gives those facts, free. Lacey & Lacey, 679 F. St., Washington, D. C. Established 1869.

Business Opportunities

MAKE THIS OFFICE TULSA HEADQUARTERS

Will buy petroleum products for your account Small commission.

Wire or Write for Details

DALE W. MOORE

532-533 Mayo Bldg., Tulsa, Okla.
Telephones: 3-4177 and 3-4178.
L. D. 136

Standard Oil Stocks on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Feb. 22 Sales	First	High	Low	Last	Change
22⅜	14⅞	18¾	14¼	£4,126,460	£ 1	Anglo-American Oil	36c	June 5, 29	.....	....	....	....	....	....
21¼	15	18	13	.....	....	do certificates	36c	June 5, 29	600	15	16⅛	15	16⅛	+ ⅛
20⅜	14⅜	17	11	.....	£ 1	do ctfs. non-voting	36c	June 5, 29	300	15⅞	15⅞	15⅞	15⅞	— ⅛
5	1⅛	2⅛	.75	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	.....	....	....	....	....	....
9¾	3¼	4⅛	1	$10,000,000	$50	do pfd	.....	.....	300	1½	1½	1½	1½	0
56	44½	46½	24¾	$1,000,000	25	Borne-Scrymser	$1 S.A.	Oct. 15, 29	.....	....	....	....	....	....
76	58	74¼	55	10,000,000	50	Buckeye Pipe Line	‡$1Q	Dec. 14, 29	500	65¼	65⅞	65¼	65⅞	— ⅛
161	117¼	210	130	3,000,000	25	Chesebrough Mfg.	‡$1Q	Dec. 30, 29	100	160	160	160	160	— 2⅝
23	16	29	8⅛	36,123,350	10	Continental Oil	.....	Dec. 15, 27	1,100	12⅞	12⅞	12⅛	12⅛	— ⅛
17½	9½	11¾	5⅝	.....	N.P.	Creole Petroleum	.....	.....	19,800	6	6	5⅝	5⅝	— ⅜
82	67	95	40	1,500,000	50	Cumberland Pipe Line	$1Q	Dec. 16, 29	50	47	47	47	47	— 3
88	64½	70½	42	5,000,000	100	Eureka Pipe Line	$1Q	Feb. 1, 30	.....	....	....	....	....	....
13	4¼	7	3	16,000,000	100	Galena Signal Oil	.....	June 30, 25	.....	....	....	....	....	....
86	26	90	73½	4,000,000	100	do new pfd	.....	June 30, 26	.....	....	....	....	....	....
89¾	35	88	71½	2,000,000	100	do old pfd	.....	June 30, 26	.....	....	....	....	....	....
114¾	59¼	128	74½	73,685,700	25	Humble Oil & Refining	50cQ	Jan. 1, 30	4,300	82¼	84¼	81⅜	83	0
290½	176½	340½	260	20,000,000	100	Illinois Pipe Line	$10S.A.	Dec. 16, 29	450	309¾	309¾	307	308	— 1⅝
104	56¾	41	22	(sh) 26,421,768	N.P.	Imperial of Canada	12½cQ	Dec. 2, 29	4,900	24½	24½	23⅞	23¾	— ⅛
91⅞	74⅜	41⅞	26	$1,000,000	$10	Indiana Pipe Line	‡50cQ	Feb. 15, 30	3,500	40	40	39¾	39¾	— ⅜
55	35	37½	15	(sh) 14,247,088	N.P.	International Petroleum	12½c	June 25, 29	29,400	18¾	19	17⅞	18¼	— 1⅛
32⅜	19⅜	25⅞	10½	$6,363,350	12.50	National Transit Co	‡25cQ	Dec. 16, 29	1,400	20⅞	20⅞	20⅜	20⅛	— ⅛
75	38½	85	72	1,000,000	10	New York Transit	‡40cQ	Jan. 15, 30	.....	....	....	....	....	....
...	...	...	...	.....	....	do new	.....	.....	.....	....	....	....	....	....
69	56½	63	41	2,000,000	50	Northern Pipe Line	$2 S.A.	Jan. 2, 30	.....	....	....	....	....	....
83½	58½	79⅞	64⅛	60,000,000	25	Ohio Oil Co	‡50cQ	Dec. 14, 29	2,100	68⅛	68⅛	66¾	68	0
84	28	44½	18⅝	10,000,000	25	Penn Mex. Fuel	$1	Dec. 14, 29	200	20⅛	20¼	20⅛	20¼	+ ⅛
220	167	50	29	4,000,000	25	Solar Refining	$1.25S.A.	Dec. 20, 29	200	31	32	31	32	— 1
19	12	23½	13	1,000,000	10	Southern Pipe Line	$10	Dec. 31, 29	200	14½	14½	14	14	— 1
71⅞	36¾	60¼	35⅛	30,000,000	25	South Penn Oil	‡50cQ	Dec. 30, 29	1,400	37⅝	38⅛	37⅝	38	0
102	70	70	45	1,750,000	50	South West Pa. Pipe Lines	$1	Dec. 31, 29	.....	....	....	....	....	....
95⅞	70⅞	63	45	348,175,069	25	S. O. Indiana	‡62½cQ	Dec. 16, 29	3,700	50⅞	51	49⅞	50½	— ⅜
27¾	15	33¾	18	8,000,000	25	S. O. Kansas	‡50cQ	Dec. 16, 29	1,800	28	28	27⅛	27¼	— 1⅛
49	44	46¾	29	25,654,516	10	S. O. Kentucky	‡40cQ	Dec. 31, 29	2,700	35⅞	36½	35¼	35⅝	— ¾
54⅝	39⅞	50¼	40	4,649,225	25	S. O. Nebraska	‡62½cQ	Dec. 20, 29	400	48⅛	48⅛	48	48	— ⅛
134	71	129	60	14,000,000	25	S. O. Ohio	62½cQ	Jan. 2, 30	5,100	83¼	86	83¼	86	0
125	116	125½	106	7,000,000	100	do pfd	$1.75Q	Dec. 2, 29	10	120	120	120	120	— 1
23½	16	18	5⅛	861,466	25	Swan Finch	30c	Jan. 15, 29	.....	....	....	....	....	....
111	72	133¾	75	126,154,000	25	Vacuum Oil	‡$1Q	Dec. 20, 29	6,200	89⅞	92	88⅛	91	+ ½

•New High †New Low ‡Also Extras

Independent Oils on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Par Value	Stocks	Transactions Week Ended Feb. 22 Sales	First	High	Low	Last	Change
1½	.53	.72	.125	$5	Amer. Cons. Oilfields	1,400	3/16	3/16	1/8	1/8	— 1/16
9½	3⅜	8⅜	1⅜	N.P.	Amer. Maracaibo	3,300	2⅛	2¼	2	2	— ⅛
4½	2¼	4¾	1	$10	Argo Oil	200	1⅜	1⅜	1¼	1¼	— ⅛
3¾	3⅛	26	3¼	N.P.	Arkansas Nat. Gas	9,600	12¾	13¼	12	12¼	— ½
....	....	9	4	10	do pfd	22,500	12⅝	13	11½	12	— ¾
....	....	24¾	6½	N.P.	do A	100	7⅞	7⅞	7⅞	7⅞	0
55	32¾	70	50	N.P.	British American Oil	.....	....	....	....	....	....
23⅞	3¾	4⅞	⅞	25c	Carib Syndicate	7,800	1⅜	1⅜	1¼	1¼	0
....	....	68⅛	20	N.P.	Cities Service new	168,000	32¼	33	31⅝	32¾	+ ⅜
103½	94½	99¼	84	100	do pfd	1,800	88½	88⅞	88⅜	88⅞	— ⅛
9⅜	8⅞	9¼	8	10	do pref. B	.....	....	....	....	....	....
97	88½	96	81	100	do pref. BB	.....	....	....	....	....	....
2¼	1	1⅛	¼	1	Colombia Syndicate	8,400	1/16	3/16	1/4	3/16	+ 1/16
17¾	9¾	15	3⅞	N.P.	Colon Oil	4,800	7¼	7¼	6	6¼	— 1
8⅞	6¼	11⅜	2½	10	Consolidated Royal	.....	....	....	....	....	....
....	....	135	42	N.P.	Cosden Oil Co	1,200	63¾	63¾	60	60¼	— 3¾
....	....	82	55	....	do pfd	.....	....	....	....	....	....
3¼	.76	2½	¼	N.P.	Crown Central	100	⅝	⅝	⅝	⅝	— 1/16
15	6¾	11¾	4	N.P.	Crystal Oil	.....	....	....	....	....	....
50	48	51⅜	51⅜	$100	do pfd	.....	....	....	....	....	....
33½	8¼	26	6½	N.P.	Darby Petroleum	5,400	8⅛	8¾	8⅛	8⅛	0
2⅞	1	11	2	N.P.	Derby Oil & Refining	2,400	5	5	4⅞	4⅞	— 1/16
21½	7⅛	44	5	N.P.	do pfd	.....	....	....	....	....	....
165	101¼	209	115	$25	Gulf Oil Corp	6,800	136	136	131¼	134⅜	— 2½
7½	5⅜	7⅜	1⅜	5	Homaokla Oil	.....	....	....	....	....	....
....	....	49¼	5	$1	Indian Territory	87,800	35¾	39⅝	35¾	38	+ 2¼
3⅜	1	2⅞	⅜	10	Intercontinental Pet.	7,500	1	1	⅞	⅞	— 1/16
3	¼	3⅜	1¼	N.P.	Kirby Petroleum	900	2	2	2	2	— ¼
9⅜	5¼	6¼	1	N.P.	Leonard Oil & Dev	2,800	1¾	1⅞	1⅜	1⅜	— ¼
43⅜	20	38⅞	18	N.P.	Lion Oil & Refg	1,600	20¾	20⅞	20⅛	20⅜	— ½
....	....	67⅞	28	N.P.	Lone Star Gas	2,400	38	38	37	37	— 1
1⅞	.50	1¼	¼	1	Magdalena Syndicate	3,900	1/16	1/16	1/16	1/16	0
48½	32	38½	15	N.P.	Margay Oil	.....	....	....	....	....	....
8	2¾	6¾	2	N.P.	Mexico-Ohio Oil	300	3	3	†2	2	— 1½
....	....	42	8	N.P.	Missouri-Kan. P. L.	24,800	22⅛	23⅛	21½	22⅞	+ ¾
1¾	.76	1⅛	¼	1	Mountain & Gulf	2,800	½	½	½	½	0
28⅞	19½	22⅞	7	10	Mountain Producers	3,400	8⅛	8½	8	8½	+ ¼
....	....	43⅞	24	N.P.	Nat. Fuel Gas (new)	5,800	32	32½	30⅝	32⅛	— ⅞
5⅜	4¼	5	2¼	5	New Bradford	500	2¾	2⅞	2⅝	2⅞	0
5½	3	3⅞	2¾	10	New England Fuel	.....	....	....	....	....	....
11⅞	7⅛	9⅜	2¼	1	New Mex. & Ariz	300	5⅜	5⅞	4¼	4¼	— 1½
15½	11½	24½	11⅜	25	New York Petrol	500	12	12	11⅞	11⅞	0
13¼	8⅛	18½	6⅜	N.P.	North Cent. Texas	600	8⅛	8⅛	6⅞	6⅞	— ⅝
....	....	19¼	8⅛	N.P.	Oil Stock, Ltd. A	900	8¼	8¼	8⅛	8¼	0
....	....	18¼	8½	N.P.	do B	.....	....	....	....	....	....
26¼	20	26⅝	12⅛	N.P.	Pacific Western Oil	1,200	13½	15⅜	13	15	+ 1¼
6	2¼	3½	½	N.P.	Pandem Oil	5,800	1½	1¾	1¼	1¾	+ ¼
15⅜	8½	10½	2⅜	N.P.	Pantepec Oil	500	3⅛	3⅛	2¾	2¾	— ⅜
20	10⅜	25½	22½	$25	Paragon Refg. B. ctfs.	.....	....	....	....	....	....
....	....	34½	17	N.P.	Petroleum Corp	5,800	21⅛	21¾	20⅜	20⅝	— 1⅛
31¾	26½	37	22	N.P.	Plymouth Oil	900	26⅛	27	26⅛	26¾	— ⅛
18	8	16	9⅛	25	Red Bank Oil	.....	....	....	....	....	....
13	4⅛	8½	1¾	N.P.	Reiter-Foster	2,100	2½	2½	2¼	2¼	— ¼
31½	23¼	25½	19	$25	Richfield pfd	1,200	21¾	21¾	21⅝	21⅝	0
....	....	29	13	....	Root Refining pfd	500	15	15	15	15	0
12	4⅝	11	3	N.P.	Ryan Consolidated	400	4⅜	4⅜	4⅛	4⅛	+ ⅛
7¼	5½	5⅞	1⅞	$10	Salt Creek Cons	200	2	2⅛	2	2	0
35	23¼	25⅞	9	10	Salt Creek Prod	2,300	10½	11	10	11	+ ½
3½	1	2½	⅛	5	Savoy Oil	.....	....	....	....	....	....
40	27	33¾	10	25	Shreveport El Dorado	.....	....	....	....	....	....
....	....	24	9½	N.P.	Southland Royalty	3,800	10	10	†9½	9¾	— ¼
....	....	12	4	N.P.	Sunray Oil	2,500	6⅜	6⅜	5½	5⅝	— ⅞
....	....	23	7⅛	N.P.	Texon Oil & Land new	300	8⅜	8⅜	8⅜	8⅜	— ⅜
22⅞	13	16⅞	11⅜	$10	Tidal Osage	.....	....	....	....	....	....
21¼	13⅜	16½	10⅛	10	do not-voting	.....	....	....	....	....	....
93¾	75	155	80	100	Transcontinental pfd.	.....	....	....	....	....	....
74¼	18	81⅛	66	10	Venezuela-Mexico	.....	....	....	....	....	....
9½	4¾	6½	1⅜	3	Venezuelan Petrol	3,900	3⅜	3⅜	3	3⅛	— ⅛
....	....	66	2¼	N.P.	White Star Oil	400	53	53	53	53	0
8¼	4⅞	9⅛	2	1	Woodley Petroleum	400	2½	2½	2½	2½	0
⅜	⅛	5⅜	¼	25	Y Oil & Gas	.....	....	....	....	....	....

•New High †New Low

New York Bonds

Week Ending Feb. 21

	High	Low	Last	Change
Assoc. Oil gold 6s	102½	102½	102½	— ⅛
Atlantic Refg. deb. 5s	100¾	100¼	100¼	— ⅛
Cal. Pet. 5s	94¾	94¼	94¾	+ ⅛
Cal. Pet. 5½s	99¾	99¼	99½	0
General Pet. 5s	101	100¾	100¼	— ⅛
Humble Oil & Refg. 5s	100¼	99¾	99¾	— ⅛
Humble Oil & Refg. 5½s	102	101⅝	101⅞	+ ⅛
Pan Amer. P & T 7s	101	100	101	0
Pan Amer. P & T 6s	102⅛	102¼	102½	0
Pan Amer. P & T 6s	93½	93⅜	93½	— ⅛
Phillips Pet. 5½s	92	91	91	— ¾
Pierce Oil deb. 8s	105	105	105	+1
Pure Oil 5½s	100	99½	100	0
Richfield Oil of Calif. 6s	96	95	95	— ¾
Shell Union Oil 5s	94¾	94	94¼	— ½
Sinclair Con. Oil 7s	101⅞	101¼	101¼	— ⅝
Sinclair Con. Oil 6½s	100½	100⅛	100⅜	+ ⅛
Sinclair Con. Oil 6s D	100⅜	100¼	100¼	— ⅛
Sinclair Con. Oil Crude 5½s	98¼	97¾	98⅛	+ ⅜
Sinclair Pipeline	95½	95	95	— ⅛
Skelly Oil 5½s	92	91	92	— ⅛
S. O. N. J. 5s	102⅝	102	102½	0
S. O. N. Y. 4½s	95⅞	95⅛	95⅜	0
Transcontinental Oil 6½s war	100	99	99	— ½
Transcontinental Oil 6½s ex-war	91½	91¼	91¼	+ ⅛
Union Oil of Calif. 6s A	107⅝	107¼	107⅝	+ ⅜
Union Oil of Calif. 5s C	100	99¼	100	+ ⅛
Warner-Quinlan 6s	86¼	85	85	—1⅜
White Eagle Oil 5½s	103	100⅞	100⅞	— ⅛

New York Curb Bonds

Week Ending Feb. 21

	High	Low	Last	Change
Beacon Oil 6s '36	103½	103	103	—1
Cities Service 5s '66	83	83	83	0
Cities Service G. 5½s '42	84½	84¼	84¼	0
Cont. Oil 5¼s '37	94½	94½	94½	0
Empire O & R 5½s '42	84¾	84¼	84¼	— ¼
Gulf Oil 5s '37	101	100¾	101	+ ⅛
Gulf Oil 5s '47	101⅛	100½	101⅛	+ ⅛
Indep. Oil 6s '39	101	100	101	— ⅛
Sun Oil 5½s '39	101½	101	101	— ½

Oil Dividends

	Amount	Payable	Stock of Record
Chesebrough Mfg. q	$1	Mar. 31	Mar. 10
do extra	50c	Mar. 31	Mar. 10
Cities Service m	2½c	Apr. 1	Mar. 13
do stock	½%	Apr. 1	Mar. 13
do pfd. and pfd. BB m	50c	Apr. 1	Mar. 13
do pref. B	5c	Apr. 1	Mar. 13
Cumberland Pipe Line m	$1	Mar. 15	Feb. 28
National Transit q	25c	Mar. 15	Feb. 28
New York Transit q	40c	Apr. 15	Mar. 21
do extra	10c	Apr. 15	Mar. 21
Praire Oil & Gas q	50c	Mar. 31	Feb. 28
Prairie Pipe Line q	75c	Mar. 31	Feb. 28
do extra	50c	Mar. 31	Feb. 28
Shell Union q	35c	Mar. 31	Mar. 6
do pfd. q	$1.37½	Apr. 1	Mar. 10
Texas Corp. q	75c	Apr. 1	Mar. 7